Project Manual
Volume 1 of 1

Chappaqua Central School District
66 Roaring Brook Road, Chappaqua, NY 10514

DISTRICT-WIDE CAPITAL IMPROVEMENTS
High School & Middle School HVAC Upgrades

Seven Bridges Middle School SED# 66-10-04-06-0-036-007
Robert E. Bell Middle School SED# 66-10-04-06-0-009-025
Horace Greeley High School SED# 66-10-04-06-0-015-023

7 October 2024 **Issue for Bid**

Architect
KG+D Architects
285 Main Street, Mount Kisco, NY 10549
914.666.5900 www.kgdarchitects.com

Systems Engineer
Barile Gallagher & Associates
39 Marble Avenue, Pleasantville, NY
914.328.6060

Structural Engineer
The DiSalvo Engineering Group
93 Lake Avenue, Suite 201, Danbury, CT 06810
203.490.4140

Civil Engineer
DTS Provident Design Engineering, LLP
One North Broadway, White Plains, NY 10601
914.428.0010

Hazardous Materials Consultant
Langan Engineering, Environmental, Surveying & Landscape Architecture, D.P.C.
One North Broadway
White Plains, NY 10601

Specifications Consultant
Susan McClymonds, AIA
200 Robb Road, Amsterdam, NY 12010
518.843.4054

THE UNDERSIGNED CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE, INFORMATION AND BELIEF, THE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE, THE STATE ENERGY CONSERVATION CONSTRUCTION CODE, AND BUILDING STANDARDS OF THE EDUCATION DEPARTMENT, AND THAT THE PLANS AND SPECIFICATIONS REQUIRE THAT NO ASBESTOS CONTAINING MATERIAL SHALL BE USED.

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NOTICE TO BIDDERS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 ROARING BROOK ROAD
CHAPPAQUA, NY 10514

The Board of Education of the Chappaqua Central School District hereby invites submission of bids for**:**

CCSD BID # B2024-14

District-Wide Capital Improvements –
High School & Middle School HVAC Upgrades

Sealed bids will be received until **November 6, 2024, no later than 2:00 pm** at the purchasing office located in the **CCSD Education Center, 66 Roaring Brook Road, Chappaqua, NY 10514,** and at that time and place all such sealed bids that have been received in accordance with the terms hereof will be publicly opened and read aloud.

The district invites bidders to bid on the work described in the Bid Documents that falls within the following bid package:

Bid Package	Trade
1	General Construction
2	HVAC
3	Electrical

See the Bid Documents for a further description of the scope of work.

Bidders must use the Bid Proposal Forms included with the Bid Documents to make their proposals, and each proposal must be made in accordance with those Forms.

Bidders may obtain the Bid Documents starting at **3:00pm on October 7, 2024,** from REVplans, 28 Church Street, Unit 7, Warwick, NY, 10990, 845-651-3845. Complete digital set of Bidding Documents may be obtained online as a download at the following website: www.revplans.biddyhq.com. Follow instructions to create an account or login if already registered. Select the “Projects” tab at the top of the screen and use the search function if needed to view this project. All bidders are urged to register to ensure receipt of all necessary information, including Bid Addenda.

There will be a **pre-bid site meeting** **Tuesday, October 15, 2024 at 3:00 pm** starting at Horace Greeley High School, 70 Roaring Brook Road, Chappaqua, NY 10514. Bidders are urged to attend the pre-bid meeting. Knowledge of the site is crucial to obtain a proper understanding of the work.

Each bid proposal must be accompanied by a certified check payable to Chappaqua Central School District or by a Bid Bond for a sum equal to five percent (5%) of the bid, as set forth in the Instructions to Bidders. All bid security, except those of the three low bidders, will be returned within four days after proposals are submitted. The bid security provided by the three low bidders will be returned after the execution of the Contract.

All Requests for Information (RFI's) must be sent in writing to the Architect, Travis Schnell, via email (tschnell@kgdarchitects.com) and Ryan Carper, via email (rcarper@kgdarchitects.com) by the end of business day, **October 23, 2024**.

The district may require the successful bidder to provide separate Performance and Labor & Materials Payment Bonds in the amount of the contract price and in the form specified in the Bid Documents.

To the fullest extent allowed by law, the district reserves the right to reject bids that contain omissions, exceptions, or modifications, or in their sole discretion to waive such irregularities, or to reject any or all bids or to accept any bid which is in the best interest of the district.

All bids shall be sealed and in an envelope that is distinctly marked on the outside as follows:

CCSD Bid # B2024-14
District-Wide Capital Improvements – High School & Middle School HVAC Upgrades
Bid Opening – November 6, 2024, 2:00 PM
Name of Bidder _____

Such bids must be delivered to Anne Holmquist, Purchasing Agent, no later than 2:00 pm on the bid opening date, at the Chappaqua Central School District, Purchasing Office, 66 Roaring Brook Road, Chappaqua, NY 10514. The district will not open or consider any proposal unless it is received at that location by no later than 2:00 pm on the bid opening date. Bidders are solely responsible for the arrival of each bid proposal at the place of bid opening by the appointed time, regardless of the means of delivery.

The Board of Education reserves the right to reject all bids which do not seem to be in the best interest of the School District.

INSTRUCTIONS TO BIDDERS

To be considered, Bids must be made in accordance with these Instructions to Bidders.

1. PROJECT DESCRIPTION

The Project consists of performing District-Wide Capital Improvements - High School & Middle School HVAC Upgrades for the Chappaqua Central School District as shown on the Contract Drawings and described in the Specifications.

1. The scope of the Work of this project is as follows:
   a. Robert E. Bell Middle School: HVAC upgrades to add air conditioning at Gym and Cafeteria.
   b. Seven Bridges Middle School: HVAC upgrades to add air conditioning at Gym.
   c. Horace Greeley High School:
      1) HVAC Upgrades: Add air conditioning at the L Building, the Cafeteria, and the Gym.
      2) Elecrical Upgrades: Electrical work associated with HVAC upgrades, and replace Boiler Room distribution board and damaged feeder cable to Gym Building.

2. The Work will be performed at the following locations:
   a. Robert E. Bell Middle School located at 50 Senter St., Chappaqua, NY 10514.
   b. Seven Bridges Middle School located at 222 Seven Bridges Road, Chappaqua, NY 10514.
   c. Horace Greeley High School located at 70 Roaring Brook Road, Chappaqua, NY 10514.

2. TYPE OF CONTRACTS

The Work of this Project will be let in three (3) separate contracts divided according to the work of the separate Prime Contractors for the following:

1. Contract No. 1 - General Construction Work
2. Contract No. 2 - HVAC Work
3. Contract No. 3 - Electrical Work

Responsibilities assigned to each separate Prime Contractor and the scope of the Work included in each contract is clearly identified in the Specifications.

3. TIME SCHEDULE

It is the intent of the Owner to award the Contracts for the Work on or about two (2) weeks after receipt of bids. Immediately upon receipt of Notice of Award of Contract from Owner, Contractors shall begin preparing required bonds, insurance certificates and other required submittals. Work may be performed at the building and site only upon receipt of written

authorization (Notice to Proceed) from Owner and after the approval of the required submissions.

The anticipated Notice to Proceed/start of construction date is as indicated in the Project Milestone Schedule included at the end of Section 011000 “Summary.”

The Work shall be Substantially Complete on or before the date(s) indicated in the Project Milestone Schedule included at the end of Section 011000 “Summary.” It is extremely important that the Owner assume its full use of the buildings and sites on the completion date(s) specified.

4. QUALIFICATIONS OF BIDDERS

The Owner may make such investigation as it deems necessary to determine the responsibility of any bidder or to determine the ability of any bidder to perform the Work. The Owner reserves the right to disqualify any prospective bidder or to reject any bid.

5. DOCUMENTS

Bidders may obtain the Bid Documents after 3:00 PM on Monday, October 7, 2024, from REVplans, 28 Church Street, Unit 7, Warwick, NY 10990; 845-651-3845. Complete digital sets of Bidding Documents may be examined, free of charge, or obtained online as a download at the following website: revplans.biddyhq.com. The fee to download digital files is $100.00. Click the Purchase button on the project's page to choose Digital Only, Hard Copy Only or Both. Costs for documents and shipping/handling are non-refundable. All bidders are urged to register to ensure receipt of all necessary information, including Bid Addenda.

Please note REVplans (revplans.biddyhq.com) is the designated location and means for distribution of all bid package information. REVplans takes no responsibility for the accuracy or completeness of Bidding Documents obtained from other sources. Obtaining Bidding Documents through REVplans enables a prospective bidder to be identified as a registered plan holder. All Bid Addenda will be transmitted to registered plan holders via email and will be available at (revplans.biddyhq.com). Plan holders who have paid for hard copies of the Bidding Documents may coordinate directly with REVplans if hard copies of Bid Addenda, if needed

6. EXAMINATION

Bidders shall carefully examine the Bid Documents and the existing building and site to obtain first-hand knowledge of existing conditions and to verify conditions under which work will be performed. Failure to do so will not relieve a successful bidder of the obligation to furnish all material and labor necessary to carry out the provisions of the Contract Documents and to complete the contemplated work for the construction set forth in his bid. Submission of a Bid will be considered conclusive evidence that a bidder has visited the site and is conversant with local facilities and difficulties, the requirements of the Contract Documents, applicable laws and codes, the state of labor and material markets, and has made due allowance in his bid for all contingencies that may arise, whether or not stated.

7. QUESTIONS

Should a bidder find discrepancies in, or omissions from the drawings or any Contract Documents, or should he be in doubt, as to their meaning, or should he find provisions of any law or applicable code conflicting with provisions of the Contract Documents, he shall at once notify the Architect in writing, who will endeavor to issue the necessary clarifications or revisions to prospective bidders by means of an Addendum. Such Addendum, as part of the Contract Documents, shall be binding on all bidders. It shall be the duty of each bidder to make certain that he has received or provided himself with copies of all Addenda. Bids will be conclusively presumed to be based upon all Addenda issued up to the time of the opening of Bids, regardless of whether or not a copy of each Addendum is actually in the possession of the bidder

Prospective bidders may request clarifications of the Bid Documents from the Architect by contacting KG + D Architects, PC, via e-mail to rcarper@kgdarchitects.com and tschnell@kgdarchitects.com All questions must be submitted in writing, no phone calls will be accepted. All correspondence must be addressed to subject line "District-Wide Capital Improvements - High School & Middle School HVAC Upgrades."

Inquiries received over the phone will not be answered. All information will be relayed to bidders by written addenda. Neither the Owner nor the Architect will be responsible for any oral instruction or clarification to any persons whatsoever. Questions received less than five (5) calendar days prior to the bid opening date cannot be answered.

If a bidder, prior to submitting a Bid, fails to give notification to the Architect of the existence of any such discrepancies, omissions, ambiguities, errors, or conflicts, he shall comply with the interpretations or directions given by the Architect in resolving same, without claiming extra costs

8. INTERPRETATION OF BID DOCUMENTS

If, in the interpretation of Bid Documents, requirements within the Drawings and Specifications conflict, or it appears that the Drawings and Specifications are not in agreement, the Contractor shall base his bid on (1) the greater quantity, where there is a discrepancy in quantity; and (2) the superior quality, where there is a discrepancy in quality.

9. PRE-BID MEETING

A pre-bid meeting will be held on Tuesday, October 15, 2024 at 3:00 PM at the main entrance to the Horace Greeley High School located at 70 Roaring Brook Road, Chappaqua, NY 10514. Attendance at the prebid meeting is not mandatory for submitting a bid but is strongly encouraged.

10. PREPARATION OF BIDS

Each Bid must be completed in duplicate on the applicable Bid Form(s) provided herein. All blank spaces must be filled in with ink in both words and figures. Erasures or other changes in a proposal must be explained or noted over the signature of the bidder. The Bid shall be signed by person or persons legally authorized to bind Bidder to Contract.

The following shall be considered part of the bid and are required to be submitted with each Bid Form:

- Certificate of Compliance with the Iran Divestment Act
- Non-Collusion Affidavit
- Bid Security
- Statement of Bidder's Qualifications (AIA A305) including Exhibits A, B, C, D and E
- Sexual Harassment Policy Certification

All blank spaces on all attachments to the Bid Form must be filled in with ink in both words and figures.

Any Bid submitted contrary to requirements above or specified, or containing omissions, conditions, or irregularities of any kind may be rejected by the Owner.

11. CERTIFICATE OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

In accordance with the requirements of General Municipal Law §103-g, the bidder is required to include with its bid either (1) the "Certification of Compliance with the Iran Divestment Act" or, in the case where the bidder is unable to make such certification, (2) the form titled "Declaration of Bidder's Inability to Provide Certification of Compliance with the Iran Divestment Act". This form is included in the Bid Documents.

12. BID SECURITY

Each bid must be accompanied by a Bid Security made payable to Chappaqua Central School District in the amount of five percent (5%) of the Bid Sum (the sum of the Base Bid plus all Add Alternates). The Bid Security shall be either a certified bank check or a Bid Bond issued by a surety company licensed to conduct business in the State of New York on the form included herein (AIA Document A310). The Bid Bond must be issued by a surety which meets the requirements set forth in the General Conditions. The successful bidder's security will be retained until he has signed the Agreement and furnished required Performance and Payment Bonds. The Owner reserves the right to retain the security of the three lowest bidders for each contract until the successful bidder enters into the contract, or until 45 days after the bid opening, whichever is longer. All other bid security will be returned within 4 days after the bid opening. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

13. CONTRACTOR'S QUALIFICATION STATEMENT

Submit a properly executed Contractor's Qualification Statement on the form included herein (AIA Document A305 with Exhibits A, B, C, D and E) with the Contractor's bid. The Contractor's Qualification Statement must be signed and notarized. All items must be answered and the data given must be clear and comprehensive. Failure to answer these questions in a complete and satisfactory manner may result in the rejection of the bid. Failure to submit a properly executed Contractor's Qualification Statement with the Bid may result in the rejection of the bid. Additional information may be submitted by bidder, if desired.

If, after evaluating the Contractor's Qualification Statement, the Owner has any doubt that a Bidder has the proper qualifications, it may require from that Bidder within 3 working days and prior to a Contract award, further written evidence of financial data, previous experience, personnel resumes, or other information. If after evaluating supplied data and investigating the evidence, the Owner has any reasonable doubt that a Bidder has the experience, available personnel, reliability, or availability of financial resources to complete the project in a timely manner and in full compliance with the requirements of the Contract, the Owner may reject the Bid and award to the next lowest qualified Bidder

14. SEXUAL HARASSMENT POLICY CERTIFICATION

Submit a fully executed Sexual Harassment Policy Certification form on the form included herein with the Contractor's bid. Failure to answer these questions in a complete and satisfactory manner may result in the rejection of the bid. Failure to submit a properly executed Sexual Harassment Policy Certification form with the Bid may result in the rejection of the bid.

15. PERFORMANCE AND LABOR AND MATERIAL BOND

The successful bidder shall provide a Performance Bond and Payment Bond made payable to Chappaqua Central School District, each in an amount at least equal to one hundred percent (100%) of the Contract Price as security for the faithful performance of his Contract and for payment of all persons performing labor and furnishing materials in connection with the project. The value of each bond shall be adjusted during the Project construction period to reflect changes in the Contract Sum. All Bonds must meet or exceed the requirements set forth in the General Conditions. Provide such bonds simultaneously with the execution of the Contract. Bonding company and bond must be approved by the Owner. Only surities licensed to do business in the State of New York may be used.

16. SUBMITTAL

Submit each Bid in an opaque, sealed envelope. Identify the envelope with: (1) project name, (2) name of bidder, (3) Contract name (e.g. Contract No. 1 - General Construction Work) and (4) proposal opening date. Submit Bids in accordance with Advertisement for Bids and with these Instructions to Bidders. If forwarded by mail, the Bid must be enclosed in another envelope and forwarded to the Owner by certified mail or tracked delivery at the address indicated in the Advertisement for Bids. The bidder assumes the risk of any delay in the mail or in handling of the bid by the Owner. The bidder assumes full responsibility for having his bid deposited on time and to the location and person indicated in the Advertisement for Bids, regardless of the method of delivery.

17. MODIFICATION AND WITHDRAWAL

No oral, facsimile, or telephonic proposals or modifications of Bids will be considered. Bids may be modified at any time prior to bid opening by submitting to the Owner a written modification, enclosed in a sealed opaque envelope, signed by the bidder, or an officer thereof if the bidder is a corporation, clearly setting forth in what respects the Bid is to be modified. Bids may be withdrawn on written or telegraphic request received from bidders prior to the time fixed for bid opening. Except as otherwise provided by law, negligence on the part of the bidder in preparing his Bid confers no right for the withdrawal of the Bid after

it has been opened. No bidder may withdraw his Bid for forty-five (45) days after the opening thereof, except as otherwise provided by law.

18. REJECTION OF BIDS

The Owner reserves the right to reject any and all Bids. The Owner reserves the right to reject any Bid for reasons including, but not limited to, the following:

a. The bidder fails to furnish any portion of the information required pursuant to the Instructions to Bidders.
b. The bidder mis-states or conceals any material fact.
c. The Bid does not strictly conform to law or to requirements of the Contract Documents.
d. The Bid is conditional.
e. The Bid is incomplete (by reason of, for example, failure to fill in an alternate price or failure to submit required documentation described herein).
f. The Bidder is deemed unqualified to undertake the work.

The Owner reserves the right, however, to waive any informalities in the Bids received when such waiver is deemed to be in its interest.

19. OPENING AND AWARD

Bids will be opened as stated in the Advertisement for Bids. The Owner will award the Contract, if at all, on or about two weeks after receipt of bids.

The Owner reserves the right to accept Alternates in any order or combination and to determine the low bidder on the basis of the sum of the Base Bid and Alternates accepted.

20. EXECUTION OF CONTRACT

After the Owner has ascertained the successful bidder, it shall send a Notice of Award of Contract to bidder to whom a Contract has been awarded.

The Contract used for this project shall be the Owner-Contractor Agreement - AIA Document A132 in the form included in the Contract Documents.

In case of failure or refusal of an accepted Bidder to enter into a Contract within ten (10) days after the issue date of the Notice of Award, or to provide the Performance and Payment Bonds simultaneously with the execution of such Contract, the bidder will be considered as having abandoned the Contract. In such event, the bidder shall be liable for and agrees to pay to the Owner, on demand, damages for such failure or refusal. Such damages shall be the difference between the price bid by him and the price for which such contract shall subsequently be relet, plus the cost of such reletting, plus any other consequential expenses and damages.

The amount of such bidder's Bid Security shall be retained by the Owner and shall be applied toward payment of such damages. If any amount remains in excess of such damages, such remaining amount shall be returned to the bidder.

21. SUBCONTRACTORS

All Subcontractors must be acceptable to the Architect and/or Owner. The Bidder shall submit the names of the Subcontractors proposed for use on the Project and all other information concerning his Subcontractors as requested by the Architect and/or Owner within the time frame stipulated. If the Architect and/or Owner disapproves any proposed Subcontractor the contractor shall submit the name of an alternate Subcontractor to whom the Architect and/or Owner has no objection in the same manner as the original submittal.

The Owner reserves the right to reject any bid if the names of the proposed Subcontractors are not submitted as required.

22. SALES AND COMPENSATING USE TAXES

The Owner is exempt from paying sales and compensating use taxes of the State of New York and of cities, counties, and other subdivisions of the State on all materials sold to it pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption shall apply to supplies and materials which are incorporated in such project. This exemption does not, however, apply to equipment rentals, small tools, and supplies for equipment such as supplies of gasoline used in operating trucks. The term "materials" as used in this article shall include supplies incorporated in this project. A Tax Exemption Certificate will be furnished to the Contractor by the Owner upon request.

23. LAWS AND REGULATIONS

All applicable State Laws, municipal ordinances, and the rules, regulations and ordinances of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

24. AFFIRMATIVE ACTION PROVISION

During the performance of this Contract, each Contractor agrees that he will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age or disability. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Each Contractor agrees to include, or require the inclusion of the above provision in any subcontract made pursuant to its contract with the Owner.

25. EQUIVALENCY CLAUSE

Whenever a material, article, device, piece of equipment or type of construction is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or similar specific information, it is so identified for the purpose of establishing a standard of quality, and such identification shall not be construed as limiting competition. Any material, article, device, piece of equipment or type of construction of other manufacturers or vendors that will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material,

article, device, piece of equipment or type of construction so proposed is completely described in submittals to the Architect and is, in the opinion of the Architect, of equal substance, appearance, and function. If the contractor desires to use any kind, type, brand, or manufacturer or material other than those named in the specifications, they shall indicate in writing, when requested, and prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified item, following procedures specified in Section 016000. Refer to Division 01 General Requirements (Section 016000) and General Conditions of the Contract for Construction.

26. PAYMENT/ACCOUNTING AND EMPLOYMENT REQUIREMENTS

Contractor shall comply with the latest NYSDOL requirements, including all posting requirements, minimum wage requirements and all other requirements.

Prevailing Wage Rates: The New York State Department of Labor PRC number assigned to this project is PRC# 2023009303. Current Wage Rate Schedules can be found here:

To access the PDF file of your schedule, click on the following link or copy and paste into your browser, type in the PRC number, and click in the Wage Schedule button.

https://apps.labor.ny.gov/wpp/doFindProject.do

NYSDOL Requirements for OSHA 10 Compliance: The Contractor shall certify that every worker employed for this project has completed an OSHA 10 safety training course prior to performing any work on the project. Valid proof of completion of the OSHA 10 training course includes copies of bona fide course completion card and training roster, attendance record, or other documentation from the certified trainer. Simply attesting that all employees have completed the course is not sufficient proof of completion.

27. POST BID PROCEDURES

A. The responsibility of bidders and of their proposed subcontractors will be considered in making the award. The Owner through the Architect may make such investigation as the Owner deems necessary to determine the responsibility of any bidder or to determine the ability of any bidder to perform the Work.

B. Bidders shall furnish all information and data required by the Owner, including financial data, within the time and in the form and manner required by the Owner. Upon notification from the Architect, the three apparent low bidders for each contract shall furnish within three (3) working days after the bid opening four (4) copies of the following information in writing:
   1. The names, addresses and phone numbers of the subcontractors and suppliers that the bidder proposes to use on the project
   2. A bar chart schedule showing the bidders' proposed plan and schedule to complete the bidder's work in accordance with the milestones outlined in the Contract Documents. The schedule shall incorporate all critical path items and any time sensitive material order and delivery dates.
   5. A proposed schedule of values for the bidder's work;
   7. A proposed list of submittals and a proposed schedule for making them, all keyed to the bar chart.
   8. A list of proposed substitutions.

9. The name, cell phone number and e-mail address of the firm's project manager assigned to this project.

C. After receipt of the above information, the Architect will designate a time and place for a meeting between the Owner, the Architect and the apparent low bidder. The apparent low bidder's principal, project manager and site superintendent will attend that meeting, at which time the parties will discuss the bidder's responsiveness, responsibility and qualifications.

D. The Owner reserves the right to disapprove the use of any proposed Subcontractor and in such event the bidder shall submit the name of another Subcontractor in a similar manner within the time specified by the Architect.

E. To the fullest extent allowed by law, the Owner reserves the right to reject any bid if the evidence required by the Owner is not submitted or fails to satisfy the Owner that the bidder is responsible, able and qualified to carry out the obligations of the Contract or to complete the Work as contemplated. The Owner will consider the information received under paragraphs A through D above in determining whether or not to accept a proposal.

F. Acceptance of a proposal will be a notice in writing signed by a duly authorized representative of the Owner.

G. Any bidder whose proposal is accepted will be required to sign the Contract within ten (10) days after receiving notice of acceptance.

H. In the event that the Owner should reject the proposal of a bidder as provided above or otherwise, at the Owner's option, the Owner may elect to meet with the next lowest bidder and to consider the information as provided in paragraphs A through D above. In the event that the proposal of the next lowest bidder is rejected as provided above or otherwise, at the Owner's option, the Owner may elect to meet with the third lowest bidder and repeat the above process. At all times the Owner retains the right to reject all bids.

END OF INSTRUCTIONS TO BIDDERS

REGULATED BUILDING MATERIALS SURVEY REPORT

For

Robert E. Bell Middle School
50 Senter Road
Chappaqua, New York 10514

Prepared For:

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, New York 10514

Prepared By:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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Craig Napolitano, CHMM
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LANGAN

September 20, 2023
Langan Project No. 101061217

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ACRONYMS

RBM	Regulated Building Materials (RBM) includes but is not limited to (Asbestos Containing Materials (ACM), Lead Containing Paint (LCP), Polychlorinated Biphenyls (PCBs), Ozone Depleting Substances (ODS), Radioactive Sources, Oil-containing Equipment, Universal Waste, and Electronic Wastes
USEPA	United States Environmental Protection Agency
NYSDOL	New York State Department of Labor
AHERA	Asbestos Hazard Emergency Response Act
OSHA	Occupational Safety and Health Administration
CAA	Clean Air Act
TSCA	Toxic Substance Control Act
CFR	Code of Federal Regulation
EPA	United States Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HUD	Housing and Urban Development
NESHAPS	National Standards for Hazardous Air Pollutants
RCRA	Resource Conservation and Recovery Act
PLM	Polarized Light Microscopy
TEM	Transmission Electron Microscopy
ACM	Asbestos-Containing Materials
LBP	Lead-Based Paint
PCB	Polychlorinated Biphenyls (PCB)
SF	Square Feet
LF	Linear Feet
mg/cm^2	Milligrams per square centimeter
PPM	Parts Per Million
XRF	X-ray Fluorescence
AAS	Atomic Absorption Spectrometry
TCLP	Toxicity Characteristic Leaching Procedure
	Definition of Regulated building materials will be needed

EXECUTIVE SUMMARY

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of the Chappaqua Central School District and summarizes regulated building materials (RBM) survey findings for the select areas of the Robert E. Bell Middle School, at 50 Senter Road, Chappaqua, NY 10514. To address potential exposure by the planned building renovation, the objective of this RBM survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP) and polychlorinated biphenyls (PCBs) containing caulk/sealants,

PROJECT INFORMATION:

Client Name:	Chappaqua Central School District	Survey Dates:	August 30 & 31, 2023
Professional's Project #:	101061207	Construction Dates:	Circa 1930's
Professional's Project Manager:	Craig Napolitano	No. of Building(s):	1
Phone No.:	646-210-6500	No. of Stories:	4
Email:	cnapolitano@langan.com	Estimated Gross Footage:	~130,000 SF
Property Address:	50 Senter Street	Basement:	Yes
Property Town, County, State:	Chappaqua, New York 10514	Property Use:	Middle School
Property Identification:	---	Last Altered	---

KEY FINDINGS

Asbestos-Containing Materials (ACM)

The following materials were reported to contain asbestos exceeding one percent (>1%) and are ACM or were not sampled but are assumed as ACM:

Material	Location	Survey Results		Estimated Quantity
ACM/ASSUMED ACM FINDINGS WITHIN SURVEYED BUILDING AREAS				
Building Interiors				
Caulking Associated with HVAC System	Mechanical room at Attic Level	ACM	6.4% Chrysotile	500 LF
Pipe Fittings		ACM as per August 2022 AHERA Report		30 LF
Pipe Insulation/Fittings	Attic Level Faculty Room (Assumed Present Above Ceiling)	ACM as per August 2022 AHERA Report		30 LF
Roof Flashing	Cafeteria Roof	ACM	6.8% Chrysotile	450 SF
Skylight Glazing/Caulking	Pitched Cupola Roof	Assumed ACM/No Access		100 LF
Pipe Fittings	Break Room-1st Floor	ACM as per August 2022 AHERA Report		30 LF
Pipe Insulation	Cafeteria & Surrounding Areas (assumed present above plaster ceiling			200 LF
Pipe Fittings				40 LF
Pipe Insulation	Kitchen/Prep/Serving Areas (assumed present above ceiling tile/plaster			120 LF
Pipe Fittings				40 LF
Duct Insulation, White	Pit area near Kitchen (1026)			90 SF
Pipe Insulation				80 LF
Pipe Fittings				50 LF

The bulk samples collected by Langan from the other suspect building materials were reported by the laboratory as "no asbestos detected". Refer to Table 1 for a summary of asbestos survey findings and Appendix A for a copy of test results and chain of custody documentation.

Lead Containing Paint (LCP)

Langan conducted 40 assays using an X-Ray Fluorescence (XRF) analyzer to screen the structure to identify lead concentrations in painted surfaces. Of the 40 XRF readings, none of the measurements had detectable concentrations of lead above 1.0 mg/cm^2.

Overall, the paint on various building components was observed in good to fair condition. Refer to Table 2 for the XRF screening data.

PCBs Findings

As per USEPA Code of Federal Regulations (40 CFR 761.3) a PCB containing bulk product is any product which contains a concentration of PCB >50 PPM. Any product which contains <50 PPM PCB is considered a non-PCB product.

Six (6) composite bulk sample of suspect caulking/sealant was collected from the various caulks on the lower and upper gym roofs, cafeteria roof and Mechanical Room and submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

1.0 INTRODUCTION

1.1 Purpose

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of the Chappaqua Central School District summarizes the regulated building materials (RBM) survey findings for the Robert E. Bell Middle School Capital Improvement project, located at 50 Senter Street, Chappaqua, NY 10514.

To address potential exposure by the planned building renovation, the objective of this RBM survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP), polychlorinated biphenyls (PCBs) containing caulk/sealants that may be disturbed in the upcoming renovation.

The remainder of this report presents our observations, findings, laboratory test results of samples collected, plans showing sampling locations, approximate locations of ACM and conclusions.

1.2 Assumptions, Limitations and Exceptions

Opinions, conclusions and recommendations presented in this report apply to the site conditions those reasonably foreseeable based solely upon Langan's visual observations of accessible areas, laboratory test data, and current regulatory requirements. They cannot necessarily apply to conditions and features of which Langan is unaware and has not had the opportunity to evaluate. The conclusions noted in this report are intended exclusively for the purpose stated herein, at the site indicated, and for the project indicated.

No survey method can completely eliminate the possibility of obtaining partial, imprecise, or incomplete information. Thus, the report does not warranty, guaranty, or represent that the surveys completely defined the locations, and/or condition of any RBMs and hazardous materials. Professional judgment was exercised in gathering and analyzing the information obtained, and Langan performed our services using that degree of skill and care ordinarily exercised under similar conditions by reputable members of Langan's profession practicing in the same or similar locality at the time of our performance.

Any suspect materials found during building remodeling, renovation or demolition which differ from materials sampled as part of this survey should be assumed to be asbestos-containing until surveyed by a properly trained and certified individual and tested by an accredited laboratory.

2.0 SITE DESCRIPTION

The surveyed Robert E. Bell Middle School is located at 50 Senter Street, Chappaqua, New York and it belongs to the Chappaqua Central School District with facilities approximately 60-80 years old. The school district is located approximately 90 miles north of New York City in Westchester County NY.

The four-story subject building is constructed out of stone, brick and steel and houses a Middle school.

3.0 ASBESTOS CONTAINING MATERIALS

3.1 Terminology

Suspect Asbestos-Containing Materials

Asbestos was used in certain types of construction and building materials. A few examples of these materials include floor tiles, ceiling panels, thermal system insulation, fireproofing insulation, roofing materials, etc. Until a material is examined using light microscopy or a similar technique, the building material is considered as a suspect asbestos-containing material. Any suspect ACM of unknown asbestos content (that is not tested) should be handled as if it were an asbestos containing material.

Asbestos–Containing Material (ACM)

According to Federal Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP), OSHA, New York State Department of Labor, Industrial Code Rule 56 (NYSDOL-ICR56) regulations, a material that is confirmed to contain greater than one percent (>1%) asbestos by polarized-light microscopy (PLM) analysis is classified as ACM. Under current EPA-NESHAP and NYSDOL-ICR56 regulations, materials that are confirmed to contain one percent or less asbestos (<1%) are considered non-ACM and are not regulated. However, the Occupational Safety and Health Administration (OSHA) still regulates these materials under its asbestos regulations. Therefore, there can be situations where EPA NESHAP regulations may not apply for specific materials, but OSHA regulations are applicable.

The EPA rule concerning the application, removal, and disposal of ACM is administered under NESHAP regulations 40 CFR 61.145, Subpart M – Standard for Demolition and Renovation. NESHAP only regulates ACM when it meets certain criteria, which is called Regulated ACM (RACM). RACM consists of

- Friable asbestos material
- Category I non-friable ACM that has become friable
- Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or
- Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Whether Friable or Category I & II materials, all ACM are regulated as per the NYSDOL-ICR56 regulations.

3.2 Survey Methodology

Langan conducted an ACM survey in general accordance with the applicable requirements of current EPA NESHAP Standard 40 CFR 61, Subpart M (Asbestos), NYSDOL-ICR56, and OSHA 29 CFR 1926.1101 asbestos survey and/or sampling protocols and sound judgement of the asbestos inspector(s).

Destructive and intrusive inspection techniques were not employed. Langan inventoried, classified, and collected representative bulk samples from suspect homogeneous areas (HAs) and submitted the samples for analysis. HAs are materials that appear similar in color, texture, and date of material application. The condition, and approximate location of each identified suspect ACM were documented.

Samples collected were properly packaged in individual plastic bags, sealed; catalogued and chain-of-custody documentation was completed. Laboratory analysis was performed following EPA 600/R-93/116 Method using Polarized Light Microscopy with Dispersion Staining (PLM/DS) which utilizes Visual Area Estimation (VAE) for determining concentrations of asbestos in a sample. Non-friable organically bound (NOB) materials which tested non-ACM via PLM were analyzed using transmission electron microscopy (TEM). Analytical testing was performed in accordance with NYSELAP Methods 198.1 (friable materials), 198.1(NOB), 198.4 (NOB-TEM), and 198.8 (surfacing materials containing vermiculite). Samples were analyzed by AmeriSci laboratory of New York (AmeriSci). AmeriSci is a member of the American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP).

3.3 Files Review

Langan received and reviewed the following reports:

- AHERA Management Plan dated August 2022
- KD&G 90% Design Scope for Work Drawings dated August 31st, 2023

3.4 Observations and Findings

The ACM survey of the subject building areas was conducted on August 30th and 31st , 2023 by Langan's Sanjay Patel, a NYSDOL certified asbestos inspector and USEPA certified lead inspector. During the survey, suspect materials observed in the surveyed building areas were documented, assessed, quantified, and sampled as necessary.

Suspect materials identified as having asbestos content greater than one percent by weight are considered to be "positive" for asbestos in accordance with the EPA/NYSDOL definition of an asbestos-containing material. In general, suspect materials identified in the building were in good to fair conditions.

Refer to Table 1 for a detailed summary of asbestos survey findings. A copy of analytical results and chain of custody documentation for the samples collected during the surveys is provided in Appendix A. Asbestos sampling locations are depicted on Figures.

3.5 Condition and Friability Assessment Table

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

Condition Definitions:

Material	Location	Friability	Condition	Estimated Quantity
Caulking associated with HVAC System	Mechanical room at Attic Level	No	Good	500 LF
Pipe Fittings		Yes	Good	30 LF
Roof Flashing	Cafeteria Roof	No	Good	450 SF
Skylight Glazing/Caulking	Pitched Cupola Roof	No	Good	100 LF
Pipe Fittings	Break Room 1st Floor	Yes	Good	30 LF
Pipe Insulation & Fittings	Cafeteria & Surrounding Areas (assumed present above plaster ceiling	Yes	Good	240 LF
Pipe Insulation & Fittings	Kitchen/Prep/Serving Areas (assumed present above ceiling tile/plaster	Yes	Good	160 LF
Duct Insulation, White	Pit area near Kitchen (1026)	Yes	Poor	90 SF
Pipe Insulation/Fittings		Yes	Poor	130 LF

Good: None/Minimal apparent damage to ACM

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

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

4.0 LEAD CONTAINING PAINT

4.1 Terminology

Lead Based Paint

As per EPA 40 CFR Part 745, TSCA, Title IV (Lead Exposure Reduction) the term ''lead-based paint'' means paint or other surface coatings that contain lead equal to or in excess of 1.0 milligrams per centimeter squared (1.0 mg/cm^2) or more than 0.5 percent by weight. Although Langan recognizes that the EPA definition of LBP is only applicable to certain residential and child-occupied structures, we are using the EPA LBP definition as a threshold for reporting.

Lead Containing Paint (LCP) or Material Containing Lead

Occupational Safety and Health Administration (OSHA) consider any measurable concentration of lead in paint or material to be lead containing paint (LCP) or lead containing material (LCM).

4.2 Limited Screening Survey Methodology

On August 30th, 2023, Langan conducted a limited lead paint screening test of painted building components. The purpose of the lead paint screening was to determine the general presence of lead-containing paints at the site. OSHA considers any concentration of lead in paint to be lead containing paint according to the OSHA Lead in Construction standard (29 CFR 1926.62).

A Heuresis Pb200i X-Ray Fluorescence (XRF) Spectrum Analyzer was used to survey the subject building for the presence of lead-containing paint (LCP). The Heuresis Pb200i analyzer uses a cobalt 57 radioactive source and an advanced solid-state radiation detector to generate an x-ray fluorescence spectrum of a painted surface. During the analysis, the intensity of the x-rays is converted by the instrument's internal software into an estimate of the concentration of lead in the substance being analyzed. The results are interpreted as concentrations of lead in milligrams per square centimeter (mg/cm^2). This device is a field-screening tool, used to collect multiple readings in a short period of time. The method of measurement is based on spectrometric analysis of lead x-ray fluorescence within a controlled depth of interrogation. The reading is an estimate of lead content in all layers of paint.

Not all painted surfaces were tested within the surveyed building areas as the purpose of the limited screening testing was to ascertain a general understanding of the

presence of lead-containing paint and coatings throughout the building. Building components were selected for testing based upon the frequency of their appearance throughout the building and relevance for significantly impacting the proposed interior demolition and renovation activities and not for determining the potential lead hazards related to occupancy of the building.

For quality control, the XRF instrument was calibrated using a U.S. Department of Commerce. National Institute of Standards and Technology (NIST) Level III 1.0 mg/cm2 lead based paint film. For each calibration, three (3) XRF readings were taken on the paint film. The average of these three (3) readings was then subtracted from the known lead content in the paint film. The difference was compared with an Environmental Protection Agency (EPA)-approved tolerance range. Such calibration procedures were conducted at the start and at the end of the workday.

4.3 LBP Findings

Based on the XRF screening data, the paint on following building components was identified to contain lead above 1.0 mg/cm^2:

- None

In general, the painted surfaces were observed in good to fair condition. Localized areas of minor damage were observed. Refer to Table 2 for the XRF screening data.

5.0 PCBs SURVEY FINDINGS

5.1 Limited Survey Methodology

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

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

PCBs are regulated under the EPA Toxic Substance Control Act (TSCA) regulations (40 CFR 261) program as well as EPA regulation 40 CFR 761. As per EPA 40 CFR 761.3, PCB-containing bulk product waste is any waste from demolition or renovation projects which contains PCBs concentration greater than 50 mg/kg. Any product containing less than 50 mg/kg PCBs is considered a non-PCB product.

A PCB screening sampling involved a visual examination of the building and sampling of suspect caulking or sealant materials.

5.2 PCBs Findings

As per USEPA Code of Federal Regulations (40 CFR 761.3) a PCB containing bulk product is any product which contains a concentration of PCB >50 PPM. Any product which contains <50 PPM PCB is considered a non-PCB product.

Six (6) composite bulk sample of suspect caulking/sealant was collected from the various caulks on the lower and upper gym roofs, cafeteria roof and Mechanical Room and submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

6.0 CONCLUSIONS

6.1 Asbestos Containing Materials

Asbestos containing materials were identified in the building surveyed areas. Refer to Table 1 for the summary of a limited asbestos survey findings. Identified ACM affected by the scope of work shall only be removed by a properly certified asbestos abatement contractor in accordance with applicable federal, state, and local regulations prior to being disturbed, including maintenance, renovation, or demolition activities. As required by the NYSDOL regulations, the abatement project must be monitored by a NYS-DOL certified project monitor. Proper notifications must be filed with the US-EPA, NYS-DOL and other regulatory agencies prior to performing such activities.

In accordance with the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) established National Emission Standards for hazardous Air Pollutants (NESHAP) to protect the public from exposure to airborne pollutants. Asbestos was one of the air pollutants, which was addressed under the NESHAP 40 CFR Part 61. The purpose of asbestos NESHAP regulations is to protect the public health by minimizing the release of asbestos when facilities, which contain ACM, are being renovated or demolished. The EPA is responsible for enforcing regulations related to asbestos during renovations

and demolition, however, the CAA allows the EPA to delegate this authority to State and Local Agencies. Even after EPA delegate's responsibility to a state or Local agency, EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

6.2 Lead Containing Paint

Painted surfaces in the building contain detectable concentrations of lead. The OSHA Lead in Construction Standard does not currently define a specific concentration of lead that must be present within paint for it to be considered "lead-containing." Therefore, painted and glazed surfaces that contain detectable concentrations of lead must be handled in accordance with the OSHA Lead in Construction Standard. Persons performing work that could impact paint films or glazing that have detectable concentrations of lead should be informed of the testing results, and take appropriate actions to comply with the OSHA Lead in Construction Standard.

Personnel performing work on lead-containing surface coatings must have, at a minimum, two-hour lead awareness training in accordance with OSHA Standard 29 CFR 1926.62. If lead-containing surface coatings are required to be stripped or removed from the building component substrate in the areas noted above with lead-containing paint, then additional training would be required based upon the measured lead concentration of the surface coating and the airborne lead concentrations measured during the work activity.

The handling, disposal, and management of waste generated during any restoration, renovation, or demolition operations is regulated by the Resource Conservation and Recovery Act (RCRA) regulations, Standards 40 CFR 240 - 280. These regulations require that a Toxic Characteristic Leaching Procedure (TCLP) test be utilized to determine if the waste generated during demolition, renovation, or removal projects is considered hazardous waste. A material is considered hazardous if it is ignitable, reactive, corrosive, or toxic. Toxicity is determined by TCLP analysis, which simulates the migration of a contaminant, such as cadmium, arsenic, or lead, in a disposal site. TCLP sampling was not part of the scope of work for this project. Therefore, prior to demolition it is recommended that representative samples of the building to be demolished be sampled and analyzed accordingly to determine if the construction debris would be considered a hazardous waste.

6.3 Polychlorinated Biphenyls (PCBs) Containing Materials

Six (6) composite bulk sample of suspect caulking/sealant was collected from the various caulks on the lower and upper gym roofs, cafeteria roof and Mechanical Room and submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

7.0 STATEMENT OF QUALIFICATIONS AND SIGNATURES

The information contained in this report is based on visual observations of the building and laboratory analytical data of the samples collected during the site visit(s). The survey was performed by Qualified Environmental Professional Mr. Sanjay Patel. These individual(s) have specific qualifications based on education, training, and/or experience to assess a property of the nature, history, and setting of the Subject Properties. Certifications of the Environmental Professionals who performed this Asbestos Survey are provided in Appendix C.

Langan Engineering, Environmental, Surveying,
Landscape Architecture, and Geology, D.P.C.

Sanjay Patel
NYSDOL Asbestos
USEPA Lead Inspector
Cert #
NYSDOL Asbestos
Inspector Cert# 98-10216

TABLES

Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS (LIMITED BUILDING AREAS SURVEYED)
Robert Bell Middle School Capital Improvements Project

Material	Sample ID	Location	Survey Results		Estimated Quantity of ACM		Notes/Comments
ACM/ASSUMED ACM FINDINGS							
Building Interiors							
Caulking associated with HVAC system	HC-1A,B	Attic Mechanical Room	ACM	–	500	LF	---
Roof Flashing	RF-1	Cafeteria Roof	ACM		450	SF	Up to 24-inch high
Skylight Glazing/Caulking	–	Pitched Cupola Roof			100	LF	No Access Pitched/slate roof near cupola
Pipe Insulation	–	Scattered locations throughout the areas surveyed	ACM	– –	80	LF	ACM as per August 2022 AHERA report by WSP.
Pipe fittings	–	Scattered locations throughout the areas surveyed	ACM	– –	200	LF	ACM as per August 2022 AHERA report by WSP.
Duct insulation	–	Pit area near kitchen	ACM	–	80	SF	ACM as per August 2022 AHERA report by WSP.
NON-ACM FINDINGS							
Building Exteriors							
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-1A	Cafeteria Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-1A	Cafeteria Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-1A	Cafeteria Roof	Non-ACM	ND	–	–	---
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-1B	Cafeteria Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-1B	Cafeteria Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-1B	Cafeteria Roof	Non-ACM	ND	–	–	---
Roof Drain Mastic	RD-1A,B	Cafeteria Roof	Non-ACM	ND	–	–	---
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-2A	Lower Gym Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-2A	Lower Gym Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-2A	Lower Gym Roof	Non-ACM	ND	–	–	---
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-2B	Lower Gym Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-2B	Lower Gym Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-2B	Lower Gym Roof	Non-ACM	ND	–	–	---
Roof Flashing	RF-2A,B	Lower Gym Roof	Non-ACM	ND	–	–	---
Roof Drain Mastic	RD-2A,B	Lower Gym Roof	Non-ACM	ND	–	–	---
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-3A	Upper Gym Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-3A	Upper Gym Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-3A	Upper Gym Roof	Non-ACM	ND	–	–	---
L4: Soft Concrete	RM-3A	Upper Gym Roof	Non-ACM	ND	–	–	---
L1: 1/4" thick roofing membrane under 2" of Gravel	RM-3B	Upper Gym Roof	Non-ACM	ND	–	–	---
L2: Tar paper assoicated with up to 2" of foam insulation	RM-3B	Upper Gym Roof	Non-ACM	ND	–	–	---
L3: 1/8" mastic on wooden deck	RM-3B	Upper Gym Roof	Non-ACM	ND	–	–	---
L4: Soft Concrete	RM-3B	Upper Gym Roof	Non-ACM	ND	–	–	---
Roof Flashing	RF-3A,B	Upper Gym Roof	Non-ACM	ND	–	–	---
Roof Drain Mastic	RD-3A,B	Upper Gym Roof	Non-ACM	ND	–	–	---
Sky Light Glazing	SLG-1A,B	Upper Gym Roof	Non-ACM	ND	–	–	---
Caulking assoicated with parapet wall metal cover	PCC-1A,B	Lower Gym Roof	Non-ACM	ND	–	–	---
Caulking assoicated with parapet wall metal cover	PCC-2A,B	Upper Gym Roof	Non-ACM	ND	–	–	---
Counter Flashing Caulking	CFC-1A,B	Cafeteria Roof	Non-ACM	ND	–	–	---
Counter Flashing Caulking	CFC-2A,B	Lower Gym Roof	Non-ACM	ND	–	–	---
Building Interiors							
Vibration Damper Cloth	VDC-1A,B	By Custodian Room, 1st Floor	Non-ACM	ND	–	–	---
Fiberglass Duct insulation Wrap	DWP-1A	Fan Room by Custodial Area	Non-ACM	ND	–	–	---
Fiberglass Duct Wrap Insulation	DWP-1B	Attic Mechanical Room	Non-ACM	ND	–	–	---
Ceiling Tile Residue and Glue Daub	GC-1-A	Gym A	Non-ACM	ND	–	–	---
Ceiling Tile Residue and Glue Daub	GC-1-B	Cafeteria	Non-ACM	ND	–	–	---

Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS (LIMITED BUILDING AREAS SURVEYED)
Robert Bell Middle School Capital Improvements Project

Material	Sample ID	Location	Survey Results		Estimated Quantity of ACM	Notes/Comments
Ceiling Plaster	CCP-1-3	Cafeteria	Non-ACM	ND	-- --	Above Drop Ceiling
Ceiling Plater	GCP-1-5	Gym A	Non-ACM	ND	-- --	---

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)

Robert Bell Middle School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
1	Calibration					1		
2	Calibration					0.9		
3	Calibration					0.9		
4	Wall	Brick	White	1st	Cafeteria	0	NEGATIVE	Fair
5	Wall	Sheetrock	Gray	1st	Cafeteria	0.1	NEGATIVE	Fair
6	Wall	Wood	Gray	1st	Cafeteria	0	NEGATIVE	Fair
7	Wall	Brick	White	1st	Cafeteria	0.1	NEGATIVE	Fair
8	Wall	Metal	Biege	1st	Cafeteria	0.1	NEGATIVE	Fair
9	Wall	Wood	Gray	1st	Cafeteria	-0.1	NEGATIVE	Fair
10	Radiator	Metal	Gray	1st	Cafeteria	0.1	NEGATIVE	Fair
11	Wall	Concrete	White	1st	Fan Room	0.2	NEGATIVE	Fair
12	Wall	Concrete	White	1st	Fan Room	0.5	NEGATIVE	Fair
13	Floor	Concrete	Gray	1st	Fan Room	0	NEGATIVE	Fair
14	Wall	Brick	White	1st	Gym A	0.6	NEGATIVE	Fair
15	Wall	Wood	White	1st	Gym A	-0.3	NEGATIVE	Fair
16	Wall	Wood	White	1st	Gym A	-0.1	NEGATIVE	Fair
17	Wall	Wood	Brown	1st	Gym A	0.1	NEGATIVE	Fair
18	Door	Wood	Varnish	1st	Gym A	0.1	NEGATIVE	Fair
19	Door Frame	Wood	D. Blue	1st	Gym A	-0.2	NEGATIVE	Fair
20	Wall	Brick	White	1st	Gym A	0.4	NEGATIVE	Fair
21	Ceiling	Plaster	White	1st	Gym A	-0.1	NEGATIVE	Fair
22	Ceiling	Plaster	White	1st	Gym A	-0.2	NEGATIVE	Fair
23	Wall	Ceramic Tile	White	1st	Gym A	-0.5	NEGATIVE	Fair
24	Wall	Ceramic Tile	White	1st	Gym A	-0.3	NEGATIVE	Fair
25	Wall	Cinderblock	White	1st	Gym B	0	NEGATIVE	Fair
26	Wall	Cinderblock	White	1st	Gym B	0	NEGATIVE	Fair
27	Wall	Cinderblock	White	1st	Gym B	0	NEGATIVE	Fair
28	Radiator Cover	Metal	Brown	1st	Gym B	-0.1	NEGATIVE	
29	Radiator Cover	Metal	Brown	1st	Gym B	-0.1	NEGATIVE	Fair
30	Door	Metal	D. Blue	1st	Gym B	0	NEGATIVE	Fair
31	Door Frame	Metal	D. Blue	1st	Gym B	0.2	NEGATIVE	Fair
32	Wall	Gypsum	White	Attic/4th	Attic Floor Teachers Lounge	0.1	NEGATIVE	Fair
33	Wall	Gypsum	White	Attic/4th	Attic Floor Teachers Lounge	0.1	NEGATIVE	Fair
34	Wall	Plaster	White	Attic/4th	Attic Floor Teachers Lounge	0.5	NEGATIVE	Fair
35	Wall	Plaster	White	Attic/4th	Attic Floor Teachers Lounge	0.2	NEGATIVE	Fair
36	Ceiling	Plaster	White	Attic/4th	Attic Floor Teachers Lounge	-0.1	NEGATIVE	Fair
37	Ceiling	Plaster	White	Attic/4th	Attic Floor Teachers Lounge	0.1	NEGATIVE	Fair
38	Door	Metal	Brown	Attic/4th	Attic Mech Room	0.1	NEGATIVE	Fair
39	Door Frame	Metal	Brown	Attic/4th	Attic Mech Room	0.1	NEGATIVE	Fair
40	Floor	Concrete	Gray	Attic/4th	Attic Mech Room	-0.1	NEGATIVE	Fair
41	Ceiling	Plaster	White	Attic/4th	Attic Mech Room	0.1	NEGATIVE	Fair
42	Wall	Plaster	White	1st	Pit Area off Kitchen	-0.1	NEGATIVE	Fair
43	Wall	Plaster	White	1st	Pit Area off Kitchen	-0.2	NEGATIVE	Fair
44	Calibration					1		
45	Calibration					1		
46	Calibration					0.9		

Note: Although Langan recognizes that the EPA definition of LBP is only applicable to certain residential and child-occupied structures, we are using the EPA LBP definition as a threshold for reporting. OSHA regulates disturbances and employee exposures to any detectable concentration of lead.

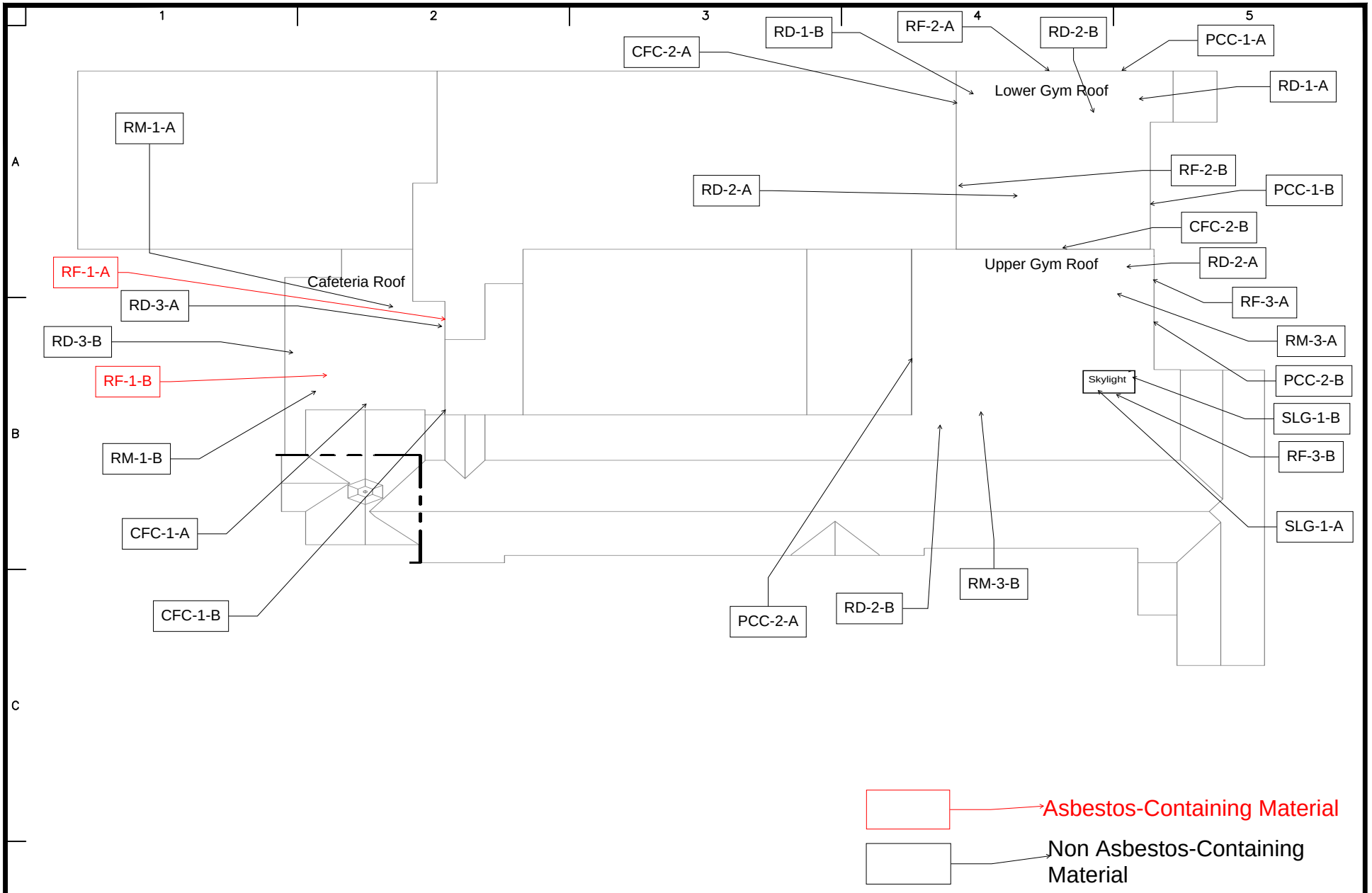
NEGATIVE	= Negative Lead Result
POSITIVE	= Positive for lead-based paint as defined under 40 CFR Part 745.

Table 3 - SUMMARY OF CAULK SAMPLE PCB ANALYSES RESULTS
Robert Bell Middle School Capital Improvements Project

ND or <50000//50 [µg/Kg]//[PPM] ---------- = Non-PCB
>50000//50 [µg/Kg]//[PPM] ---------- **= PCB Containing**

Material	Sample ID #	Sample Location	Parameter	Results	Units	Reporting Level	Approximate Quantities, Locations of PCB Caulk / Comments
Skylight Glazing	SLG-1		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Caulking assoicated with parapet wall metal cover-Lower Gym Roof	PCC-1		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Caulking assoicated with parapet wall metal cover-Upper Gym Roof	PCC-2		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Counter Flashing Caulking-Cafeteria Roof	CFC-1		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Counter Flashing Caulking-Lower Gym Roof	CFC-2		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Air Handling Caulking	HC-1		PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	38,000 // 38.0	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	

FIGURES



GENERAL NOTES:

A. THIS PLAN IS PROVIDED TO SHOW APPROXIMATE SAMPLING LOCATIONS. THE ACTUAL LAYOUT OF THE BUILDING AND BUILDING EQUIPMENT MAY BE SLIGHTLY DIFFERENT THAN SHOWN.

LANGAN
Langan Engineering and Environmental Services, Inc.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ Certificate of Authorization No.24GA27996400

Project

Robert E. Bell MS Capital Improvements Project

Drawing Title

ASBESTOS SAMPLING LOCATIONS
Roof Level

Project No.	101061217
Date	9/18/2023
Drawn By	SP
Checked By	CN

Drawing No. **ASL-1**

Sheet 1 of 4

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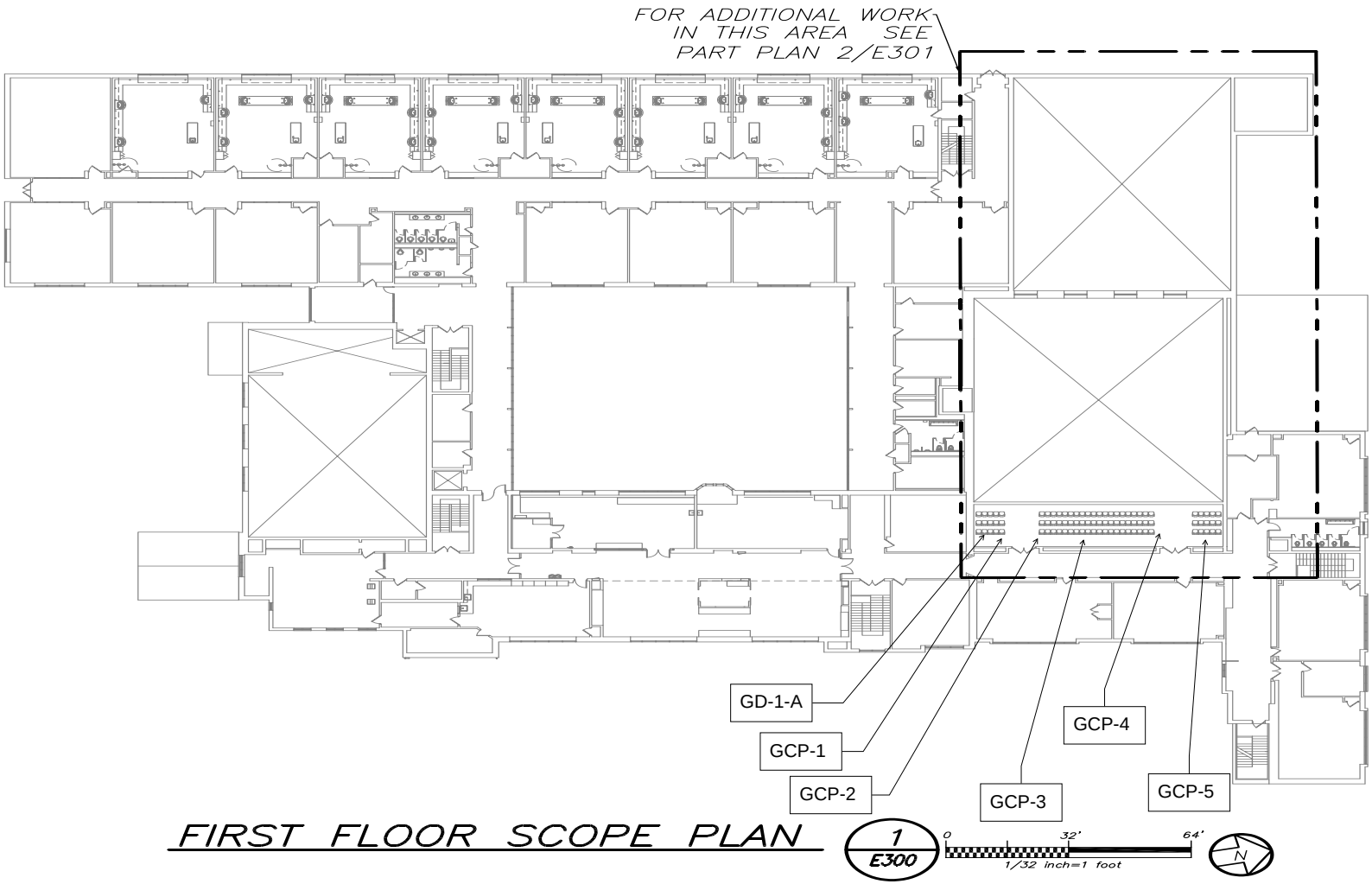

FIRST FLOOR SCOPE PLAN

Asbestos-Containing Material

Non Asbestos-Containing Material

GENERAL NOTES:

A. THIS PLAN IS PROVIDED TO SHOW APPROXIMATE SAMPLING LOCATIONS. THE ACTUAL LAYOUT OF THE BUILDING AND BUILDING EQUIPMENT MAY BE SLIGHTLY DIFFERENT THAN SHOWN.

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Project
Robert E. Bell MS Capital Improvements Project

Drawing Title
ASBESTOS SAMPLING LOCATIONS
First Floor

Project No. 101061217
Date 9/18/2023
Drawn By SP
Checked By CN

Drawing No. **ASL - 2**
Sheet 2 of 4

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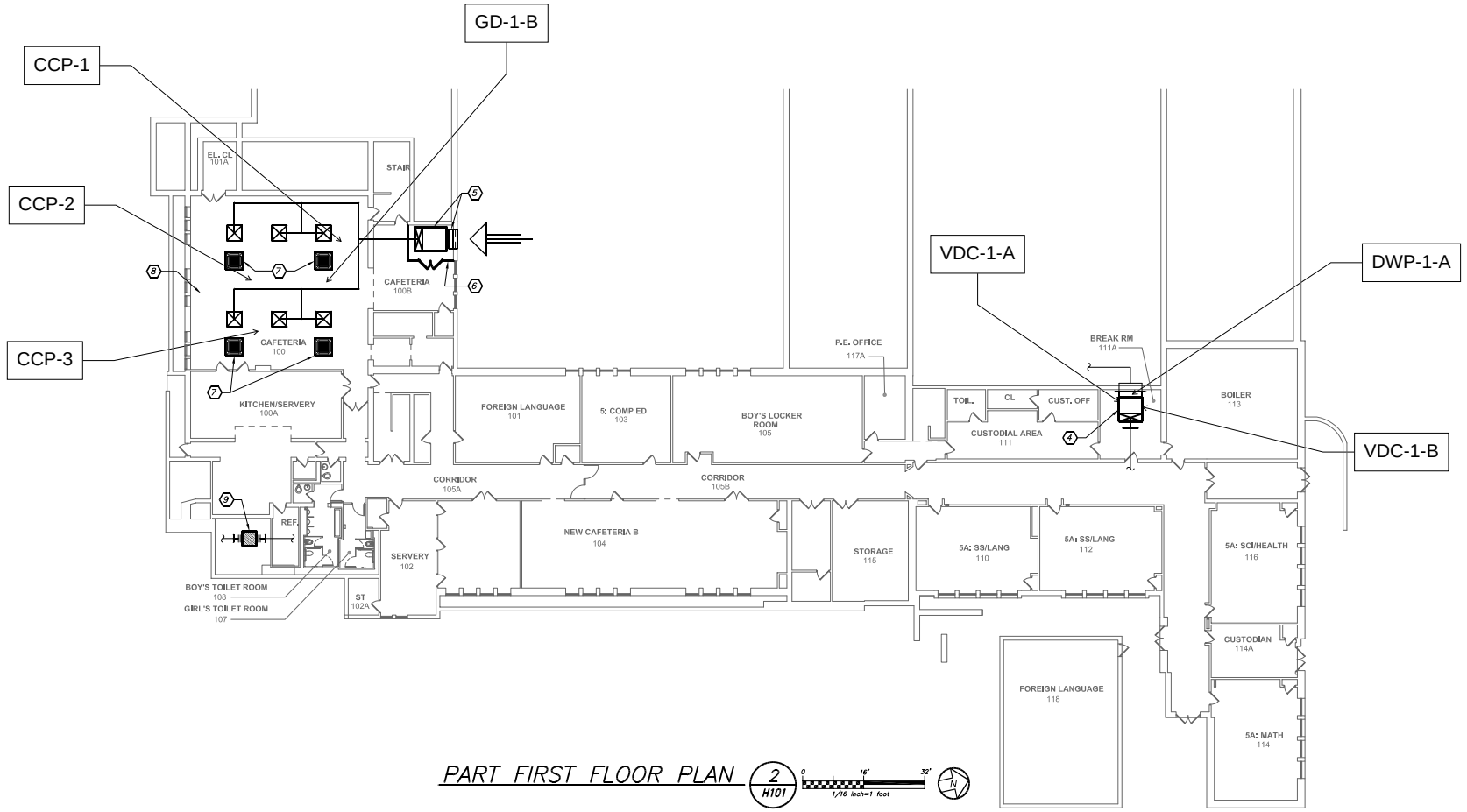

Asbestos-Containing Material

Non Asbestos-Containing Material

GENERAL NOTES:

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Project

Robert E. Bell MS Capital Improvements Project

Drawing Title

ASBESTOS SAMPLING LOCATIONS

Partial 1st Floor

Project No.	101061217
Date	9/18/2023
Drawn By	SP
Checked By	CN

Drawing No. **ASL - 3**

Sheet 3 of 4

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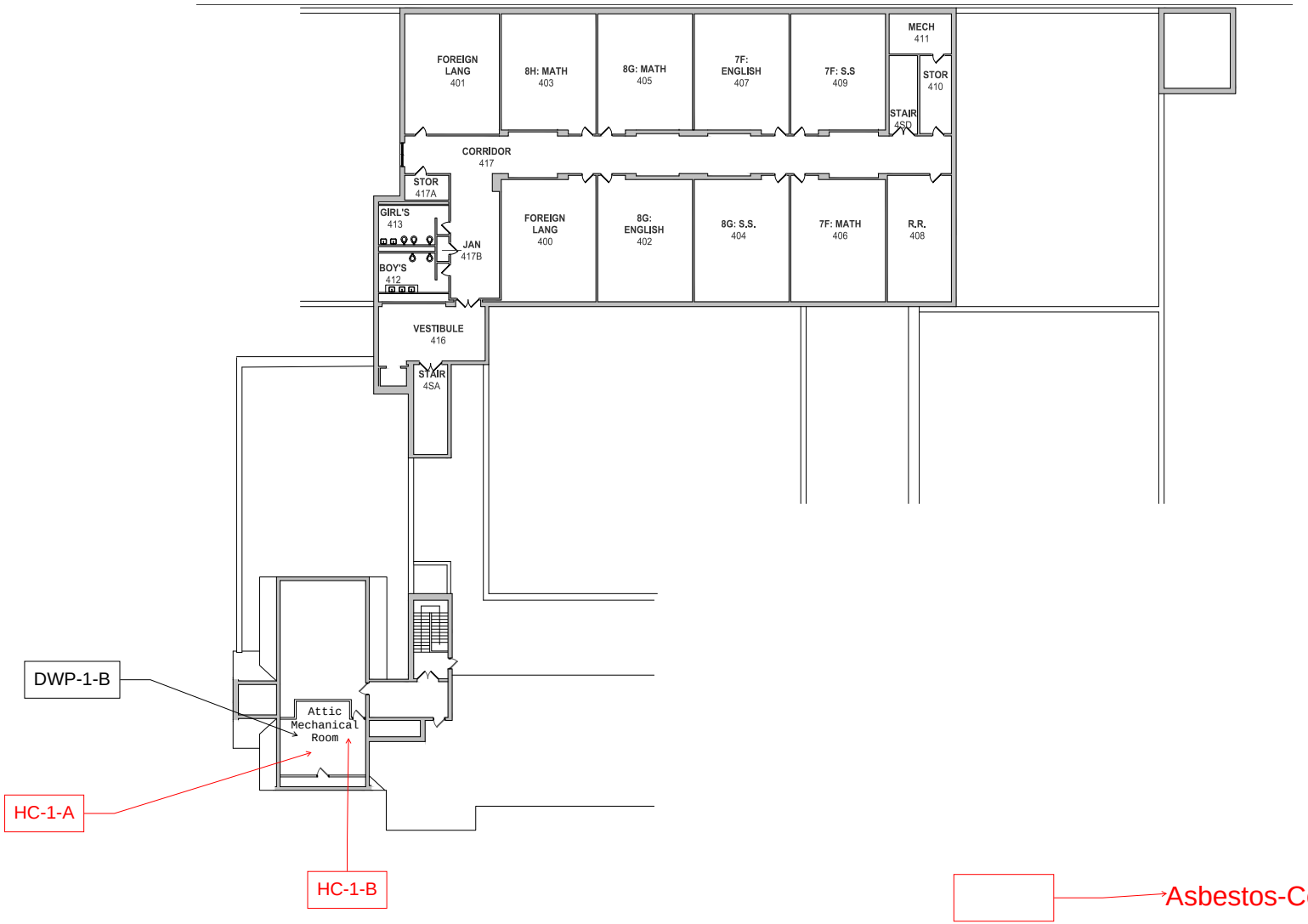

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Project
Robert E. Bell MS
Capital Improvements Project

Drawing Title
ASBESTOS SAMPLING LOCATIONS
Attic/4th Level

Project No. 101061217
Date 9/18/2023
Drawn By SP
Checked By CN

Drawing No. **ASL - 4**
Sheet 4 of 4

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A P P E N D I X A

Laboratory Test Results and Chain of Custody Documentations (Asbestos)

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 09/05/23
Date Examined 09/07/23
ELAP # 11480

AmeriSci Job # 223091184
P.O. #
Page 1 **of** 11

RE: 101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-1-A-L1 RM1L1	223091184-01 **Location:** Cafeteria Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18.2%			
RM-1-A-L2 RM1L2	223091184-02 **Location:** Cafeteria Roof - Tar Paper Associated With Up To 2" Of Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.4%			
RM-1-A-L3 RM1L3	223091184-03 **Location:** Cafeteria Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.3%			
RM-1-B-L1 RM1L1	223091184-04 **Location:** Cafeteria Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.9%			
RM-1-B-L2 RM1L2	223091184-05 **Location:** Cafeteria Roof - Tar Paper Associated With Up To 2" Of Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.4%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-1-B-L3 RM1L3	223091184-06 **Location:** Cafeteria Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.2%			
RF-1-A RF1	223091184-07 **Location:** Cafeteria Roof - Roof Flashing	***Yes***	6.8% (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.8 % **Other Material:** Non-fibrous 10.2%			
RF-1-B RF1	223091184-08 **Location:** Cafeteria Roof - Roof Flashing		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
RD-1-A RD1	223091184-09 **Location:** Cafeteria Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1%			
RD-1-B RD1	223091184-10 **Location:** Cafeteria Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.3%			
RM-2-A-L1 RM2L1	223091184-11 **Location:** Lower Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 11.9%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-2-A-L2 RM2L2	223091184-12 **Location:** Lower Gym Roof - Tar Paper Associated With Up To 2" OF Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10%			
RM-2-A-L3 RM2L3	223091184-13 **Location:** Lower Gym Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 17.5%			
RM-2-B-L1 RM2L1	223091184-14 **Location:** Lower Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5%			
RM-2-B-L2 RM2L2	223091184-15 **Location:** Lower Gym Roof - Tar Paper Associated With Up To 2" OF Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.4%			
RM-2-B-L3 RM2L3	223091184-16 **Location:** Lower Gym Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.1%			
RF-2-A RF2	223091184-17 **Location:** Lower Gym Roof - Roof Flashing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RF-2-B RF2	223091184-18 **Location:** Lower Gym Roof - Roof Flashing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.2%			
RD-2-A RD2	223091184-19 **Location:** Lower Gym Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.9%			
RD-2-B RD2	223091184-20 **Location:** Lower Gym Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 21.4%			
RM-3-A-L1 RM3L1	223091184-21 **Location:** Upper Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7%			
RM-3-A-L2 RM3L2	223091184-22 **Location:** Upper Gym Roof - Tar Paper Associated With Up To 2" Of Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 22.8%			
RM-3-A-L3 RM3L3	223091184-23 **Location:** Upper Gym Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12%			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-3-A-L4 RM3L4	223091184-24 **Location:** Upper Gym Roof - Soft Concrete	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
RM-3-B-L1 RM3L1	223091184-25 **Location:** Upper Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.6%			
RM-3-B-L2 RM3L2	223091184-26 **Location:** Upper Gym Roof - Tar Paper Associated With Up To 2" Of Foam Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.5%			
RM-3-B-L3 RM3L3	223091184-27 **Location:** Upper Gym Roof - 1/8" Mastic On Wooden Deck	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.2%			
RM-3-B-L4 RM3L4	223091184-28 **Location:** Upper Gym Roof - Soft Concrete	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
RF-3-A RF3	223091184-29 **Location:** Upper Gym Roof - Roof Flashing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.8%			

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PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RF-3-B RF3	223091184-30 **Location:** Upper Gym Roof - Roof Flashing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.8%			
RD-3-A RD3	223091184-31 **Location:** Lower Gym Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.5%			
RD-3-B RD3	223091184-32 **Location:** Lower Gym Roof - Roof Drain Mastic	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8%			
SLG-1-A SLG1	223091184-33 **Location:** Upper Gym Roof - Sky Light Glazing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 14.2%			
SLG-1-B SLG1	223091184-34 **Location:** Upper Gym Roof - Sky Light Glazing	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18.4%			
PCC-1-A PCC1	223091184-35 **Location:** Lower Gym Roof - Caulking Associated With Parapet Wall Metal Cover	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.2%			

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PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
PCC-1-B PCC1	223091184-36 **Location:** Lower Gym Roof - Caulking Associated With Parapet Wall Metal Cover	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.7%			
PCC-2-A PCC2	223091184-37 **Location:** Upper Gym Roof - Caulking Associated With Parapet Wall Metal Cover	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.1%			
PCC-2-B PCC2	223091184-38 **Location:** Upper Gym Roof - Caulking Associated With Parapet Wall Metal Cover	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.6%			
CFC-1-A CFC1	223091184-39 **Location:** Cafeteria Roof - Counter Flashing Caulking	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18.3%			
CFC-1-B CFC1	223091184-40 **Location:** Cafeteria Roof - Counter Flashing Caulking	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7%			
CFC-2-A CFC2	223091184-41 **Location:** Lower Gym Roof - Counter Flashing Caulking	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.4%			

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PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CFC-2-B CFC2	223091184-42 **Location:** Lower Gym Roof - Counter Flashing Caulking	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7%			
HC-1-A HC1	223091184-43 **Location:** Attic Mechanical Room - Air Handling Caulking	***Yes***	6.4% (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.4 % **Other Material:** Non-fibrous 25.7%			
HC-1-B HC1	223091184-44 **Location:** Attic Mechanical Room - Air Handling Caulking		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
VDC-1-A VDC1	223091184-45 **Location:** By Custodian Roof In 1st Floor - Vibration Damper Cloth	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.1%			
VDC-1-B VDC1	223091184-46 **Location:** By Custodian Roof In 1st Floor - Vibration Damper Cloth	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.8%			
DWP-1-A DWP1	223091184-47 **Location:** Fan Room By Custodial Area - Fiber Glass Duct Wrap Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Brown, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.2%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
DWP-1-B DWP1	223091184-48 **Location:** Fan Room By Custodial Area - Fiber Glass Duct Wrap Insulation	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Black/Brown, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7%			
GD-1-A GD1	223091184-49L1 **Location:** Gym A - Ceiling Tile Residue And Glue Daub - Tile	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: White/Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 36.9%			
GD-1-A GD1	223091184-49L2 **Location:** Gym A - Ceiling Tile Residue And Glue Daub - Glue	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 45.4%			
GD-1-B GD1	223091184-50 **Location:** Gym A - Ceiling Tile Residue And Glue Daub "Physically Inseparable Layers In Sample - Sample Composited For Analysis"	***No***	NAD (by NYS ELAP 198.6) by Bo Sun on 09/07/23
Analyst Description: White/Brown, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44%			
CCP-1	223091184-51 **Location:** Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
CCP-2	223091184-52 **Location:** Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CCP-3	223091184-53	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
GCP-1	223091184-54	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Gym - Gym Ceiling Plaster			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
GCP-2	223091184-55	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Gym - Gym Ceiling Plaster			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
GCP-3	223091184-56	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Gym - Gym Ceiling Plaster			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
GCP-4	223091184-57	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Gym - Gym Ceiling Plaster			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
GCP-5	223091184-58	***No***	NAD (by NYS ELAP 198.1) by Bo Sun on 09/07/23
Location: Gym - Gym Ceiling Plaster			
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

Reporting Notes:

Analyzed by: Bo Sun
Date: 9/7/2023

Reviewed by: John P. Koubiadis

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000538, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	RM-1-A-L1	RM1L1	0.777	58.3	23.5	18.2	NAD	NAD
Location:	Cafeteria Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel							
02	RM-1-A-L2	RM1L2	0.215	86.5	4.1	9.4	NAD	NAD
Location:	Cafeteria Roof - Tar Paper Associated With Up To 2" Of Foam Insulation							
03	RM-1-A-L3	RM1L3	0.487	88.6	6.1	5.3	NAD	NAD
Location:	Cafeteria Roof - 1/8" Mastic On Wooden Deck							
04	RM-1-B-L1	RM1L1	0.636	56.1	23.0	20.9	NAD	NAD
Location:	Cafeteria Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel							
05	RM-1-B-L2	RM1L2	0.536	59.3	21.4	19.4	NAD	NAD
Location:	Cafeteria Roof - Tar Paper Associated With Up To 2" Of Foam Insulation							
06	RM-1-B-L3	RM1L3	0.187	88.5	4.3	7.2	NAD	NAD
Location:	Cafeteria Roof - 1/8" Mastic On Wooden Deck							
07	RF-1-A	RF1	0.646	59.5	23.6	10.2	Chrysotile 6.8	NA
Location:	Cafeteria Roof - Roof Flashing							
08	RF-1-B	RF1	0.548	60.5	26.5	13.1	NA/PS	NA
Location:	Cafeteria Roof - Roof Flashing							
09	RD-1-A	RD1	0.355	71.4	27.6	1.0	NAD	NAD
Location:	Cafeteria Roof - Roof Drain Mastic							
10	RD-1-B	RD1	0.310	61.1	29.6	9.3	NAD	NAD
Location:	Cafeteria Roof - Roof Drain Mastic							
11	RM-2-A-L1	RM2L1	0.941	59.0	24.1	16.9	NAD	NAD
Location:	Lower Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel							
12	RM-2-A-L2	RM2L2	0.255	73.3	16.7	10.0	NAD	NAD
Location:	Lower Gym Roof - Tar Paper Associated With Up To 2" OF Foam Insulation							
13	RM-2-A-L3	RM2L3	0.373	57.2	25.2	17.5	NAD	NAD
Location:	Lower Gym Roof - 1/8" Mastic On Wooden Deck							
14	RM-2-B-L1	RM2L1	0.658	94.2	0.8	5.0	NAD	NAD
Location:	Lower Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel							
15	RM-2-B-L2	RM2L2	0.203	92.8	1.8	5.4	NAD	NAD
Location:	Lower Gym Roof - Tar Paper Associated With Up To 2" OF Foam Insulation							
16	RM-2-B-L3	RM2L3	0.241	88.3	3.6	8.1	NAD	NAD
Location:	Lower Gym Roof - 1/8" Mastic On Wooden Deck							

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AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	RF-2-A	RF2	0.459	58.3	30.7	11.0	NAD	NAD
Location: Lower Gym Roof - Roof Flashing								
18	RF-2-B	RF2	0.510	50.5	42.3	7.2	NAD	NAD
Location: Lower Gym Roof - Roof Flashing								
19	RD-2-A	RD2	0.411	78.3	13.8	7.9	NAD	NAD
Location: Lower Gym Roof - Roof Drain Mastic								
20	RD-2-B	RD2	0.358	60.4	18.2	21.4	NAD	NAD
Location: Lower Gym Roof - Roof Drain Mastic								
21	RM-3-A-L1	RM3L1	0.764	91.1	1.9	7.0	NAD	NAD
Location: Upper Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel								
22	RM-3-A-L2	RM3L2	0.192	75.0	2.2	22.8	NAD	NAD
Location: Upper Gym Roof - Tar Paper Associated With Up To 2" Of Foam Insulation								
23	RM-3-A-L3	RM3L3	0.398	86.5	1.5	12.0	NAD	NAD
Location: Upper Gym Roof - 1/8" Mastic On Wooden Deck								
24	RM-3-A-L4	RM3L4	----	----	----	----	NAD	NA
Location: Upper Gym Roof - Soft Concrete								
25	RM-3-B-L1	RM3L1	0.622	90.7	1.6	7.6	NAD	NAD
Location: Upper Gym Roof - 1/4" Thick Roofing Membrane Under Up To 2" Of Gravel								
26	RM-3-B-L2	RM3L2	0.406	85.6	2.0	12.5	NAD	NAD
Location: Upper Gym Roof - Tar Paper Associated With Up To 2" Of Foam Insulation								
27	RM-3-B-L3	RM3L3	0.423	95.8	2.1	2.2	NAD	NAD
Location: Upper Gym Roof - 1/8" Mastic On Wooden Deck								
28	RM-3-B-L4	RM3L4	----	----	----	----	NAD	NA
Location: Upper Gym Roof - Soft Concrete								
29	RF-3-A	RF3	0.488	53.3	37.9	8.7	NAD	Chrysotile Trace
Location: Upper Gym Roof - Roof Flashing								
30	RF-3-B	RF3	0.534	59.6	30.6	9.8	NAD	NAD
Location: Upper Gym Roof - Roof Flashing								
31	RD-3-A	RD3	0.524	61.0	28.5	10.5	NAD	NAD
Location: Lower Gym Roof - Roof Drain Mastic								
32	RD-3-B	RD3	0.307	59.4	28.8	11.8	NAD	NAD
Location: Lower Gym Roof - Roof Drain Mastic								

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AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	SLG-1-A	SLG1	0.329	76.4	9.4	14.2	NAD	NAD
Location: Upper Gym Roof - Sky Light Glazing								
34	SLG-1-B	SLG1	0.243	73.4	8.2	18.4	NAD	NAD
Location: Upper Gym Roof - Sky Light Glazing								
35	PCC-1-A	PCC1	0.197	64.6	27.2	8.2	NAD	NAD
Location: Lower Gym Roof - Caulking Associated With Parapet Wall Metal Cover								
36	PCC-1-B	PCC1	0.224	68.5	23.8	7.7	NAD	NAD
Location: Lower Gym Roof - Caulking Associated With Parapet Wall Metal Cover								
37	PCC-2-A	PCC2	0.320	47.0	45.9	7.1	NAD	NAD
Location: Upper Gym Roof - Caulking Associated With Parapet Wall Metal Cover								
38	PCC-2-B	PCC2	0.326	76.7	15.8	7.6	NAD	NAD
Location: Upper Gym Roof - Caulking Associated With Parapet Wall Metal Cover								
39	CFC-1-A	CFC1	0.333	49.1	32.6	18.3	NAD	NAD
Location: Cafeteria Roof - Counter Flashing Caulking								
40	CFC-1-B	CFC1	0.207	48.4	40.9	10.7	NAD	NAD
Location: Cafeteria Roof - Counter Flashing Caulking								
41	CFC-2-A	CFC2	0.225	71.1	21.6	7.4	NAD	NAD
Location: Lower Gym Roof - Counter Flashing Caulking								
42	CFC-2-B	CFC2	0.341	66.2	23.1	10.7	NAD	NAD
Location: Lower Gym Roof - Counter Flashing Caulking								
43	HC-1-A	HC1	0.252	41.1	26.8	25.7	Chrysotile 6.4	NA
Location: Attic Mechanical Room - Air Handling Caulking								
44	HC-1-B	HC1	0.267	39.9	25.9	34.2	NA/PS	NA
Location: Attic Mechanical Room - Air Handling Caulking								
45	VDC-1-A	VDC1	0.092	68.4	30.5	1.1	NAD	NAD
Location: By Custodian Roof In 1st Floor - Vibration Damper Cloth								
46	VDC-1-B	VDC1	0.131	43.8	46.3	9.8	NAD	NAD
Location: By Custodian Roof In 1st Floor - Vibration Damper Cloth								
47	DWP-1-A	DWP1	0.133	89.2	3.6	7.2	NAD	NAD
Location: Fan Room By Custodial Area - Fiber Glass Duct Wrap Insulation								
48	DWP-1-B	DWP1	0.117	88.8	4.3	7.0	NAD	NAD
Location: Fan Room By Custodial Area - Fiber Glass Duct Wrap Insulation								

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Summary of Bulk Asbestos Analysis Results

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49L1	GD-1-A	GD1	0.535	34.9	28.2	36.9	NAD	NAD
Location: Gym A - Ceiling Tile Residue And Glue Daub - Tile								
49L2	GD-1-A	GD1	0.375	50.0	4.6	45.4	NAD	NAD
Location: Gym A - Ceiling Tile Residue And Glue Daub - Glue								
50	GD-1-B	GD1	0.309	37.6	18.4	44.0	NAD	NAD
Location: Gym A - Ceiling Tile Residue And Glue Daub "Physically Inseparable Layers In Sample - Sample Composited For Analysis"								
51	CCP-1		----	----	----	----	NAD	NA
Location: Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling								
52	CCP-2		----	----	----	----	NAD	NA
Location: Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling								
53	CCP-3		----	----	----	----	NAD	NA
Location: Cafeteria - Cafeteria Ceiling Plaster Above Drop Ceiling								
54	GCP-1		----	----	----	----	NAD	NA
Location: Gym - Gym Ceiling Plaster								
55	GCP-2		----	----	----	----	NAD	NA
Location: Gym - Gym Ceiling Plaster								
56	GCP-3		----	----	----	----	NAD	NA
Location: Gym - Gym Ceiling Plaster								
57	GCP-4		----	----	----	----	NAD	NA
Location: Gym - Gym Ceiling Plaster								
58	GCP-5		----	----	----	----	NAD	NA
Location: Gym - Gym Ceiling Plaster								

See Reporting notes on last page

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061217; Robert E. Bell MS; 50 Senter St, Chappaqua, New York 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM

Analyzed by: John P. Koubiadis

Reviewed by: John P. Koubiadis

Date: 9/8/2023

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Craig Napolitano
	Chappaqua, New York 10514	Phone No:	973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos			Analysis Requested for Lead		Analysis Requested for PCB	Results
				PLM	PLM-NOB	TEM	AAS	TCLP	EPA Method 8082	
1	**RM-1-A**	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Cafeteria roof		X	X				
2	**RM-1-A**	L2: tar paper associated with up to 2" of foam insulation	Cafeteria roof		X	X				
3	**RM-1-A**	L3: 1/8" Mastic on wooden deck	Cafeteria roof		X	X				
4	**RM-1-B**	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Cafeteria roof		X	X				
5	**RM-1-B**	L2: tar paper associated with up to 2" of foam insulation	Cafeteria roof		X	X				
6	**RM-1-B**	L3: 1/8" Mastic on wooden deck	Cafeteria roof		X	X				
7	**RF-1-A**	Roof flashing	Cafeteria roof		X	X				
8	**RF-1-B**	Roof flashing	Cafeteria roof		X	X				
9	**RD-1-A**	Roof drain mastic	Cafeteria roof		X	X				
10	**RD-1-B**	Roof drain mastic	Cafeteria roof		X	X				

Total No. of Samples: 223091184 10

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to cnapolitano@langan.com and spatel@langan.com.

Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	FEDEX 1100		9/5/23	10:41
Company: **LANGAN**			Company: Amer. Sci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St Chappaqua, New York 10514	Auth. By: Phone No:	Craig Napolitano 973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216 DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
11	RM-2-A	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Lower Gym roof		X	X				
12	RM-2-A	L2: tar paper associated with up to 2" of foam insulation	Lower Gym roof		X	X				
13	RM-2-A	L3: 1/8" Mastic on wooden deck	Lower Gym roof		X	X				
14	RM-2-B	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Lower Gym roof		X	X				
15	RM-2-B	L2: tar paper associated with up to 2" of foam insulation	Lower Gym roof		X	X				
16	RM-2-B	L3: 1/8" Mastic on wooden deck	Lower Gym roof		X	X				
17	RF-2-A	Roof flashing	Lower Gym roof		X	X				
18	RF-2-B	Roof flashing	Lower Gym roof		X	X				
19	RD-2-A	Roof drain mastic	Lower Gym roof		X	X				
20	RD-2-B	Roof drain mastic	Lower Gym roof		X	X				

Total No. of Samples: 10

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
				X	

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Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	FEDEX 1100		9/5/23	10:41
Company: LANGAN			Company: Amerisci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Craig Napolitano
	Chappaqua, New York 10514	Phone No:	973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
21	RM-3-A	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Upper Gym roof		X	X				
22	RM-3-A	L2: tar paper associated with up to 2" of foam insulation	Upper Gym roof		X	X				
23	RM-3-A	L3: 1/8" Mastic on wooden deck	Upper Gym roof		X	X				
24	RM-3-A	L4: soft concrete	Upper Gym roof	X						
25	RM-3-B	L1: 1/4 " thick roofing membrane under up to 2" of gravel	Upper Gym roof		X	X				
26	RM-3-B	L2: tar paper associated with up to 2" of foam insulation	Upper Gym roof		X	X				
27	RM-3-B	L3: 1/8" Mastic on wooden deck	Upper Gym roof		X	X				
28	RM-3-B	L4: soft concrete	Upper Gym roof	X						
29	RF-3-A	Roof flashing	Upper Gym roof		X	X				
30	RF-3-B	Roof flashing	Upper Gym roof		X	X				

22309 1184

Total No. of Samples: 10

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to cnapolitano@langan.com and spatel@langan.com.

Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	FEDEX 1100		9/5/23	10:41
Company: LANGAN			Company: Amerisci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Craig Napolitano
	Chappaqua, New York 10514	Phone No:	973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
31	RD-3-A	Roof drain mastic	Lower Gym roof		X	X				
32	RD-3-B	Roof drain mastic	Lower Gym roof		X	X				
33	SLG-1-A	sky light glazing	Upper gym roof		X	X				
34	SLG-1-B	sky light glazing	Upper gym roof		X	X				
35	PCC-1-A	Caulking associated with parapet wall metal cover	Lower Gym roof		X	X				
36	PCC-1-B	Caulking associated with parapet wall metal cover	Lower Gym roof		X	X				
37	PCC-2-A	Caulking associated with parapet wall metal cover	Upper gym roof		X	X				
38	PCC-2-B	Caulking associated with parapet wall metal cover	Upper gym roof		X	X				
39	CFC-1-A	Counter flashing caulking	Cafeteria roof		X	X				
40	CFC-1-B	Counter flashing caulking	Cafeteria roof		X	X				

Total No. of Samples: 10

2230911184

Turnaround Request:	RUSH	12 hours	24 hours	48 hours	72 hours	5 days
					x	

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to cnapolitano@langan.com and spatel@langan.com.

Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	FEDEX 1100		9/5/23	10:41
Company: LANGAN			Company: AmeriSci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Craig Napolitano
	Chappaqua, New York 10514	Phone No:	973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
41	CFC-2-A	Counter flashing caulking	Lower Gym roof		X	X				
42	CFC-2-B	Counter flashing caulking	Lower Gym roof		X	X				
43	HC-1-A	Air handling caulking	Attic mechanical room		X	X				
44	HC-1-B	Air handling caulking	Attic mechanical room		X	X				
45	VDC-1-A	Vibration damper cloth	By custodian room in 1st floor		X	X				
46	VDC-1-B	Vibration damper cloth	By custodian room in 1st floor		X	X				
47	DWP-1-A	Fiber glass duct wrap insulation	Fan room by custodial area		X	X				
48	DWP-1-B	Fiber glass duct wrap insulation	Fan room by custodial area		X	X				
49	GD-1-A	Ceiling tile residue and glue daub	Gym A		X	X				
50	GD-1-B	Ceiling tile residue and glue daub	Gym A		X	X				

223091184

Total No. of Samples: 10

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to cnapolitano@langan.com and spatel@langan.com.

Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	FEDEX 1100		9/5/23	10:41
Company: **LANGAN**			Company: AmeriSci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Craig Napolitano
	Chappaqua, New York 10514	Phone No:	973.560.4610
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	DIEGO MARTINEZ NYS 18-50252		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
51	CCP-1	Cafeteria ceiling plaster above drop ceiling	Cafeteria	X						
52	CCP-2	Cafeteria ceiling plaster above drop ceiling	Cafeteria	X						
53	CCP-3	Cafeteria ceiling plaster above drop ceiling	Cafeteria	X						
54	GCP-1	Gym ceiling plaster	Gym	X						
55	GCP-2	Gym ceiling plaster	Gym	X						
56	GCP-3	Gym ceiling plaster	Gym	X						
57	GCP-4	Gym ceiling plaster	Gym	X						
58	GCP-5	Gym ceiling plaster	Gym	X						

223091184

Total No. of Samples: 8

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to cnapolitano@langan.com and spatel@langan.com.

Please analyze all fireproofing, plaster and wall coating materials samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	DIEGO MARTINEZ	Date:	Time:	Received by:	Date: / Time:
		9-1-23	FEDEX 1100		9/5/23 10:41
Company:	LANGAN			Company:	Amerisci

Laboratory Name:

A P P E N D I X B

Laboratory Results and Chain-of-Custody Documentation (PCBs)

Wednesday, September 13, 2023

Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Project ID: **101061217 ROBERT E. BELL MS**
SDG ID: **GCO89376**
Sample ID#s: **CO89376 - CO89381**

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

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.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

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

September 13, 2023

SDG I.D.: GCO89376

Project ID: 101061217 ROBERT E. BELL MS

Client Id	Lab Id	Matrix
SLG-1	CO89376	CAULK
PCC-1	CO89377	CAULK
PCC-2	CO89378	CAULK
CFC-1	CO89379	CAULK
CFC-2	CO89380	CAULK
HC-1	CO89381	CAULK

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

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89376

Project ID: 101061217 ROBERT E. BELL MS
Client ID: SLG-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/07/23	Q/R/AC1/K	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1221	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1232	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1242	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1248	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1254	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1260	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1262	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1268	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	
Total PCBs	ND	580	ug/Kg	1	09/08/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	56		%	1	09/08/23	SC	30 - 150 %	
% DCBP (Confirmation)	49		%	1	09/08/23	SC	30 - 150 %	
% TCMX	41		%	1	09/08/23	SC	30 - 150 %	
% TCMX (Confirmation)	45		%	1	09/08/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

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:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

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.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

PHOENIX
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

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89377

Project ID: 101061217 ROBERT E. BELL MS
Client ID: PCC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/07/23	Q/R/AC1/K	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1221	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1232	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1242	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1248	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1254	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1260	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1262	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1268	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
Total PCBs	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	54		%	1	09/08/23	SC	30 - 150 %	
% DCBP (Confirmation)	48		%	1	09/08/23	SC	30 - 150 %	
% TCMX	41		%	1	09/08/23	SC	30 - 150 %	
% TCMX (Confirmation)	45		%	1	09/08/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

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Comments:

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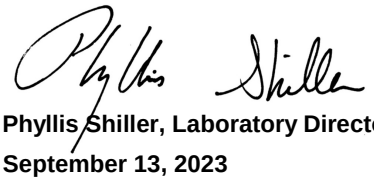

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

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

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89378

Project ID: 101061217 ROBERT E. BELL MS
Client ID: PCC-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/07/23	Q/R/AC1/K	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1221	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1232	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1242	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1248	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1254	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1260	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1262	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1268	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	
Total PCBs	ND	880	ug/Kg	1	09/08/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	52		%	1	09/08/23	SC	30 - 150 %	
% DCBP (Confirmation)	47		%	1	09/08/23	SC	30 - 150 %	
% TCMX	41		%	1	09/08/23	SC	30 - 150 %	
% TCMX (Confirmation)	45		%	1	09/08/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

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:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

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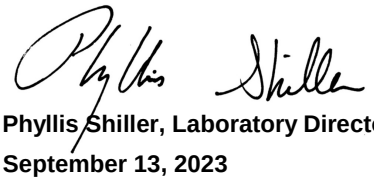

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

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Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89379

Project ID: 101061217 ROBERT E. BELL MS
Client ID: CFC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/11/23	/R/AC1, R	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1221	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1232	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1242	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1248	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1254	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1260	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1262	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
PCB-1268	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	
Total PCBs	ND	850	ug/Kg	1	09/12/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	62		%	1	09/12/23	SC	30 - 150 %	
% DCBP (Confirmation)	49		%	1	09/12/23	SC	30 - 150 %	
% TCMX	57		%	1	09/12/23	SC	30 - 150 %	
% TCMX (Confirmation)	45		%	1	09/12/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

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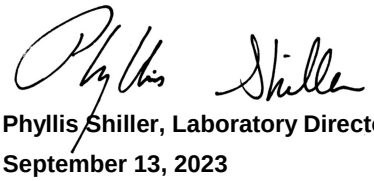

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

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Analysis Report

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89380

Project ID: 101061217 ROBERT E. BELL MS
Client ID: CFC-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/07/23	Q/R/AC1/K	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1221	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1232	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1242	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1248	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1254	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1260	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1262	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
PCB-1268	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	
Total PCBs	ND	1000	ug/Kg	1	09/08/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	47		%	1	09/08/23	SC	30 - 150 %	
% DCBP (Confirmation)	39		%	1	09/08/23	SC	30 - 150 %	
% TCMX	34		%	1	09/08/23	SC	30 - 150 %	
% TCMX (Confirmation)	33		%	1	09/08/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

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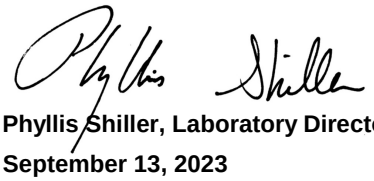

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

PHOENIX
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

September 13, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	MB, SP	08/31/23	
Location Code:	LANGANNJ	Received by:	SR1	09/05/23	11:02
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCO89376
Phoenix ID: CO89381

Project ID: 101061217 ROBERT E. BELL MS
Client ID: HC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				09/07/23	Q/R/AC1/K	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1221	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1232	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1242	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1248	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1254	38000	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1260	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1262	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
PCB-1268	ND	1000	ug/Kg	5	09/08/23	SC	SW8082A	
Total PCBs	38000	1000	ug/Kg	5	09/08/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	103		%	5	09/08/23	SC	30 - 150 %	
% DCBP (Confirmation)	115		%	5	09/08/23	SC	30 - 150 %	
% TCMX	61		%	5	09/08/23	SC	30 - 150 %	
% TCMX (Confirmation)	62		%	5	09/08/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

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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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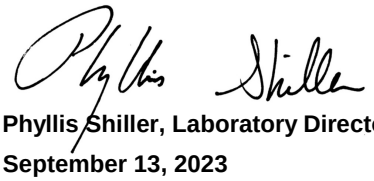

Phyllis Shiller, Laboratory Director
September 13, 2023
Reviewed and Released by: Anil Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

NY # 11301

QA/QC Report

September 13, 2023

QA/QC Data

SDG I.D.: GCO89376

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 696468 (ug/Kg), QC Sample No: CO89379 10X (CO89379)											
Polychlorinated Biphenyls											
PCB-1016	ND	170	97	100	3.0				40 - 140	30	
PCB-1221	ND	170							40 - 140	30	
PCB-1232	ND	170							40 - 140	30	
PCB-1242	ND	170							40 - 140	30	
PCB-1248	ND	170							40 - 140	30	
PCB-1254	ND	170							40 - 140	30	
PCB-1260	ND	170	95	98	3.1				40 - 140	30	
PCB-1262	ND	170							40 - 140	30	
PCB-1268	ND	170							40 - 140	30	
% DCBP (Surrogate Rec)	104	%	105	109	3.7				30 - 150	30	
% DCBP (Surrogate Rec) (Confirm	112	%	107	109	1.9				30 - 150	30	
% TCMX (Surrogate Rec)	91	%	91	94	3.2				30 - 150	30	
% TCMX (Surrogate Rec) (Confirm	92	%	93	96	3.2				30 - 150	30	
Comment:											
A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.											
QA/QC Batch 696039 (ug/Kg), QC Sample No: CO89773 10X (CO89376, CO89377, CO89378, CO89380, CO89381)											
Polychlorinated Biphenyls											
PCB-1016	ND	170	40	34	16.2				40 - 140	30	I
PCB-1221	ND	170							40 - 140	30	
PCB-1232	ND	170							40 - 140	30	
PCB-1242	ND	170							40 - 140	30	
PCB-1248	ND	170							40 - 140	30	
PCB-1254	ND	170							40 - 140	30	
PCB-1260	ND	170	95	94	1.1				40 - 140	30	
PCB-1262	ND	170							40 - 140	30	
PCB-1268	ND	170							40 - 140	30	
% DCBP (Surrogate Rec)	106	%	139	146	4.9				30 - 150	30	
% DCBP (Surrogate Rec) (Confirm	124	%	117	120	2.5				30 - 150	30	
% TCMX (Surrogate Rec)	86	%	18	21	15.4				30 - 150	30	I
% TCMX (Surrogate Rec) (Confirm	87	%	16	20	22.2				30 - 150	30	I
Comment:											
A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.											

I = This parameter is outside laboratory LCS/LCSD specified recovery limits.

QA/QC Data

SDG I.D.: GCO89376

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits

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
September 13, 2023

Wednesday, September 13, 2023

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCO89376 - LANGANNJ

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CO89381	$PCB_SMR_S	PCB-1254	NY / Requested PCB RL /	38000	1000	1000	1000	ug/Kg
CO89381	$PCB_SMR_S	Total PCBs	NY / Requested PCB RL /	38000	1000	1000	1000	ug/Kg

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

September 13, 2023 SDG I.D.: GCO89376

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report:

PCB Narration

AU-ECD48 09/12/23-1: CO89379

The following Continuing Calibration compounds did not meet % deviation criteria:
Samples: CO89379
Preceding CC 912B003 - PCB 1260 17%H (%)
Succeeding CC 912B023 - None.

AU-ECD7 09/08/23-1: CO89380

The following Continuing Calibration compounds did not meet % deviation criteria:
Samples: CO89380
Preceding CC 908B027 - None.
Succeeding CC 908B039 - PCB 1260 17%H (%)

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

September 13, 2023

SDG I.D.: GCO89376

The samples in this delivery group were received at 20.4°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

20.4° no cooler no ice

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Robert E. Bell MS		
Address:	50 Senter St	Auth. By:	Vijay Patel
	Chappaqua, New York 10514	Phone No:	973.560.4983
Langan Job No.:	101061217	Sampling Date:	8-31-23
Sampled By/License #:	MIROSLAW BARAN / NYC114570/NYS03-03533		
	SANJAY PATEL / NYC115945/NYS98-10216		

	Sample ID	Description of Composite Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
1	SLG-1	sky light glazing	Upper gym roof						X	89376
2	PCC-1	Caulking associated with parapet wall metal cover	Lower Gym roof						X	89377
3	PCC-2	Caulking associated with parapet wall metal cover	Upper gym roof						X	89378
4	CFC-1	Counter flashing caulking	Cafeteria roof						X	89379
5	CFC-2	Counter flashing caulking	Lower Gym roof						X	89380
6	HC-1	Air handling caulking	Attic mechanical room						X	89381

Total No. of Samples: 6

Turnaround Request:

RUSH	12 hours	24 hours	48 hours	72 hours	5 days
					X

Laboratory Instructions: Please e-mail results to mbaran@langan.com and vpatel@langan.com.

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
DIEGO MARTINEZ	9-1-23	Fedex 1100	Fedex		
Company: LANGAN			Company: Emily A	9/5/23	11:02

Laboratory Name:

A P P E N D I X C

Langan's Certifications and Laboratory Accreditations

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive, 4th Floor, Parsippany, NJ, 07054

License Number: 70336
License Class: RESTRICTED
Date of Issue: 02/17/2023
Expiration Date: 03/31/2024
Duly Authorized Representative: Vijay Patel

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

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S

SANJAYKUMAR PATEL
CLASS(EXPIRES)
C ATEC(09/23) D INSP(09/23)
H PM (09/23)

CERT# 98-10216
DMV# 587051083

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 006455055 10

EYES BLK
HAIR BLK
HGT 6' 00"

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

United States Environmental Protection Agency

This is to certify that

Sanjaykumar B Patel

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 November 20, 2024

LBP-R-4543-2

Certification #

June 04, 2021

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

NEW YORK STATE OF OPPORTUNITY. Department of Health

KATHY HOCHUL
Governor

JAMES V. McDONALD, M.D., M.P.H.
Acting Commissioner

MEGAN E. BALDWIN
Acting Executive Deputy Commissioner

LAB ID: 11480

March 30, 2023

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

Certificate Expiration Date:
April 01, 2024

Dear Ms. Lu,

Enclosed are certificate(s) of approval issued to your environmental laboratory for the current permit year. The certificate(s) supersede(s) any previously issued one(s) and is(are) in effect through the expiration date listed. Please carefully examine the certificate(s) to insure that the categories, subcategories, analytes, and methods for which your laboratory is approved are correct. In addition, verify that your laboratory's name, address, lead technical director, and identification number are accurate.

Pursuant to NYCRR Subpart 55-2.2, original certificates must be posted conspicuously in the laboratory and copies shall be made available to any client of the laboratory upon request.

Pursuant to NYCRR Subpart 55-2.6, any misrepresentation of the fields of accreditation (category - method - analyte) for which your laboratory is approved may result in denial, suspension, or revocation of your certification. Any use of the Environmental Laboratory Approval Program (ELAP) or National Environmental Laboratory Accreditation Program (NELAP) name, reference to the laboratory's approval status, and/or using the NELAP logo in any catalogs, advertising, business solicitations, proposals, quotations, laboratory analytical reports, or other materials must include the laboratory's ELAP identification number and distinguish between testing for which the laboratory is approved and testing for which the laboratory is not approved.

If you have any questions, please contact us at the Environmental Laboratory Approval Program, Wadsworth Center, New York State Department of Health, Empire State Plaza, Albany NY, 12237; by phone at (518) 485-5570; by facsimile at (518) 485-5568; and by email at elap@health.ny.gov.

Sincerely,

Amy J. Steuerwald

Amy J. Steuerwald, Ph.D.
Director, Environmental Laboratory Approval Program

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2024
Issued April 01, 2022
Revised March 30, 2023

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Miscellaneous

Asbestos	EPA 100.2

Serial No.: 66401

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2024
Issued April 01, 2022
Revised March 30, 2023

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

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

Serial No.: 66402

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2024
Issued April 01, 2022
Revised March 30, 2023

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
	NIOSH 7402
Fibers	NIOSH 7400 A RULES

Serial No.: 66403

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

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

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2023-07-01 through 2024-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

A P P E N D I X D

File Search/Archive Materials
Scope of Work Drawings

CHAPPAQUA CENTRAL SCHOOL DISTRICT

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

66 Roaring Brook Road Chappaqua, NY 10514

AUGUST 31, 2023

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS
NYSED Project Control No.
BE: 66-10-04-06-0-009-025
SB: 66-10-04-06-0-036-007

KG+D Project No.
2023-1028

ISSUE FOR PRICING - 90% CONSTRUCTION DOCUMENTS

Exp. 01-31-2024

SEVEN BRIDGES MIDDLE SCHOOL
222 Seven Bridges Road, Chappaqua, NY 10514
NYSED Control No. 66-10-04-06-0-036-007

ROBERT E. BELL MIDDLE SCHOOL
50 Senter Street, Chappaqua, NY 10514
NYSED Control No. 66-10-04-06-0-009-025

LIST OF DRAWINGS

G000	COVER
CIVIL	
SP-SB-1	SEVEN BRIDGES MIDDLE SCHOOL SITE IMPROVEMENT PLAN
SP-SB-3.1	SITE DETAILS
STRUCTURAL	
S001	GENERAL NOTES
S101-BE	BELL MS PART ROOF & FIRST FLOOR FRAMING PLANS
S102-SB	SEVEN BRIDGES MS GYM ROOF FRAMING PLAN
S200	TYPICAL DETAILS
ARCHITECTURAL	
A101	ROBERT E. BELL & SEVEN BRIDGES PLANS & DETAILS

MECHANICAL	
H101-BE	ROBERT E. BELL LEGEND, NOTES, & PART FIRST & ATTIC PLAN
H102-BE	ROBERT E. BELL PART SECOND & THIRD FLOOR PLANS
H201-BE	ROBERT E. BELL PART FIRST & ATTIC PLANS
H202-BE	ROBERT E. BELL PART FIRST, SECOND & THIRD FLOOR PLANS
H203-BE	ROBERT E. BELL ROOF PLAN
H301-BE	ROBERT E. BELL SCHEDULES
H401-BE	ROBERT E. BELL DETAILS
H101-SB	SEVEN BRIDGES LEGEND, NOTES & GYM FLOOR PLANS
H301-SB	SEVEN BRIDGES SCHEDULES
H401-SB	SEVEN BRIDGES DETAILS
ELECTRICAL	
E001	LEGEND, ABBREVIATIONS & NOTES
E101-BE	ROBERT E. BELL FIRST FLOOR PART REMOVAL PLAN
E102-BE	ROBERT E. BELL THIRD FLOOR PART REMOVAL PLAN
E201-BE	ROBERT E. BELL FIRST & FOURTH FLOOR PART LIGHTING PLAN
E301-BE	ROBERT E. BELL FIRST FLOOR PART POWER PLAN
E302-BE	ROBERT E. BELL THIRD & FOURTH FLOOR PART POWER PLAN
E303-BE	ROBERT E. BELL CONDUIT PATH
E501-BE	ROBERT E. BELL PART POWER RISER & SCHEDULES
E101-SB	SEVEN BRIDGES LOWER LEVEL PART REMOVAL PLAN
E301-SB	SEVEN BRIDGES LOWER LEVEL PART POWER PLAN
E501-SB	SEVEN BRIDGES RISER & SCHEDULE
E701	DETAILS

Sheet total: 30

PROJECT SCOPE DESCRIPTION

SEVEN BRIDGES MIDDLE SCHOOL:
- BASEBALL FIELD MODIFICATIONS
- HVAC UPGRADES
  - -ADD GYM A/C

ROBERT E. BELL MIDDLE SCHOOL:
- HVAC UPGRADES
  - -ADD GYM A/C
  - -ADD CAFETERIA A/C

DESIGN TEAM

ARCHITECT
KG+D Architects, PC
285 Maint Street
Mount Kisco, NY 10549
phone: 914.666.5900

CIVIL ENGINEER
DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
phone: 914.428.0010

STRUCTURAL ENGINEER
The Di Salvo Engineering Group, Inc
93 Lake Avenue, Suite 201
Danbury, CT 06810
phone: 203.490.4140

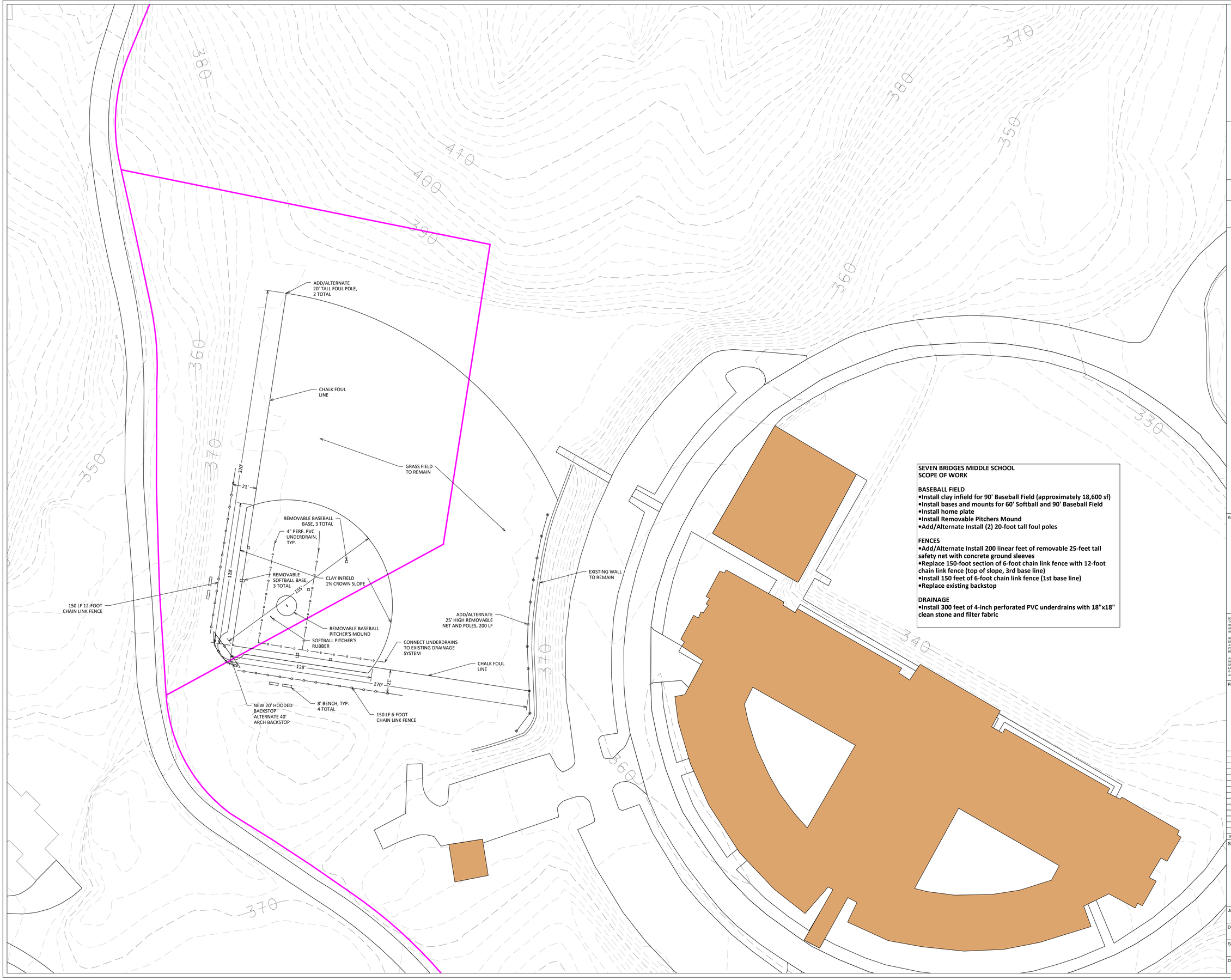
ROOFING CONSULTANT
Watsky Associates, Inc
20 Madison Ave
Valhalla, NY 10595
phone: 914.948.3450

SYSTEMS ENGINEER
Barile Gallagher & Associates Consulting Engineers, PC
39 Marble Avenue
Pleasantville, NY 10570
phone: 914.328.6060

COVER

G000

PLOTTED BY: DYNEY TUNG SCHWALBE, LLP SHOGREN, MARK J. 8/31/2023 11:39 AM G:\CADD\1006 CHAPPAQUA CENTRAL SCHOOL DISTRICT\1006 GIS BASEMAP PLT.DWG



SEVEN BRIDGES MIDDLE SCHOOL
SCOPE OF WORK

BASEBALL FIELD
- **Install clay infield for 90' Baseball Field (approximately 18,600 sf)**
- **Install bases and mounts for 60' Softball and 90' Baseball Field**
- **Install home plate**
- **Install Removable Pitchers Mound**
- **Add/Alternate Install (2) 20-foot tall foul poles**

FENCES
- **Add/Alternate Install 200 linear feet of removable 25-feet tall safety net with concrete ground sleeves**
- **Replace 150-foot section of 6-foot chain link fence with 12-foot chain link fence (top of slope, 3rd base line)**
- **Install 150 feet of 6-foot chain link fence (1st base line)**
- **Replace existing backstop**

DRAINAGE
- **Install 300 feet of 4-inch perforated PVC underdrains with 18"x18" clean stone and filter fabric**

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

KG+D ARCHITECTS, PC
285 MAIN STREET•MOUNT KISCO, NEW YORK 10549
P: 914.666.5900 KGDARCHITECTS.COM

ISSUE FOR PRICING - 90% CONSTRUCTION DOCUMENTS

SED Control No.
BE: 66-10-04-06-0-009-025
SB: 66-10-04-06-0-036-007

DTS Provident
Intelligent Land Use
DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10601
CA#: 0017846 P: 914.428.0010 F: 914.428.0017

Key Plan

N 0 15 30 60
SCALE: 1" = 30'

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EXPIRES 1/31/24

No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

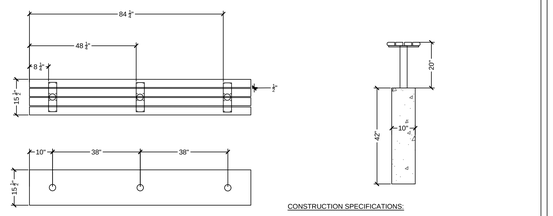
Sheet Title

SEVEN BRIDGES MIDDLE SCHOOL SITE IMPROVEMENT PLAN

Job No. 1006
Date 6/1/23
Scale 1" = 30'
Drawn / Checked MJS / GMS

Sheet Number

SP-SB-1

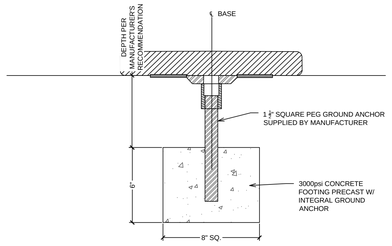


CONSTRUCTION SPECIFICATIONS:

1. 8' RECYCLED PLASTIC BENCH WITHOUT BACK. ITEM #251-1035 MANUFACTURED BY THE PARK AND FACILITIES OR APPROVED EQUAL. WWW.THEPARKCATALOG.COM
2. BENCH COLOR SHALL BE CEDAR WITH BLACK FRAME.
3. INSTALL PER MANUFACTURER'S SPECIFICATIONS AND/OR RECOMMENDATIONS.

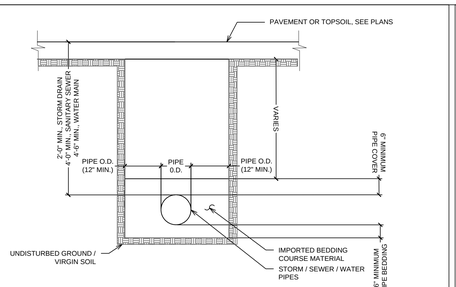
BALL FIELD BENCH
SCALE: N.T.S.

1



BASE ANCHORING
SCALE: N.T.S.

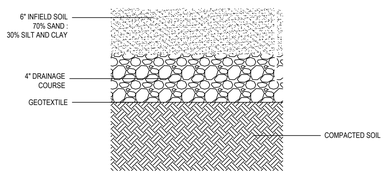
2



NOTES:
1. WHEN PIPES ARE TO BE INSTALLED IN FILL SECTIONS, THE CONTRACTOR SHALL INSTALL CRUSHED STONE, GRAVEL OR APPROVED STRUCTURAL FILL.
2. BACKFILL TO 95% RELATIVE MATERIAL COMPACTED DRY DENSITY AT OPTIMUM MOISTURE UNDER PAVED AREAS AND 90% UNDER LANDSCAPED AREAS (TYP.)
3. BACKFILL WITH 90PSI FLOWABLE CONCRETE IN TOWN R.O.W. (K-CRETE)
4. K-CRETE BACKFILL SHALL BE USED IN ALL TRENCHING (SANITARY SEWER AND WATER MAIN) LOCATED WITHIN THE EXISTING PAVEMENT. PRIOR TO THE PLACEMENT OF THE K-CRETE BACKFILL, THE PIPE SHALL BE SURROUNDED WITH A MINIMUM OF 12-INCHES OF NYSDOT ITEM 304.05 OR CLEAN SAND AS DIRECTED BY THE UTILITY OWNER. THE REMAINDER OF THE TRENCH (UP TO THE BOTTOM OFPAVEMENT SECTION) SHALL THEN CONSIST OF K-CRETE.

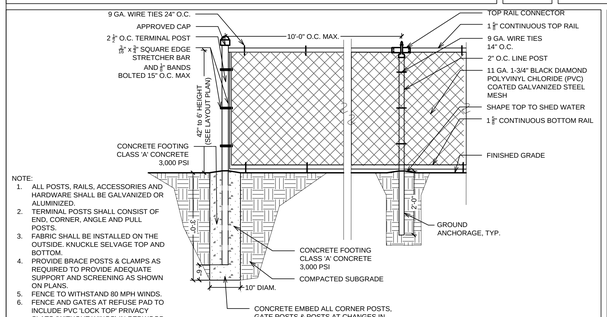
TRENCH DETAIL
SCALE: N.T.S.

3



INFIELD SOIL MIX
SCALE: N.T.S.

4

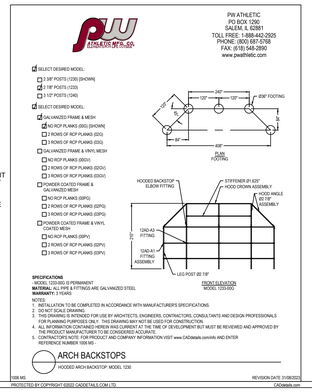


NOTE:
1. ALL POSTS, RAILS, ACCESSORIES AND HARDWARE SHALL BE GALVANIZED OR ALUMINIZED.
2. TERMINAL POSTS SHALL CONSIST OF END, CORNER, ANGLE AND PULL POSTS.
3. FABRIC SHALL BE INSTALLED ON THE OUTSIDE. KNUCKLE SELVAGE TOP AND BOTTOM.
4. PROVIDE BRACE POSTS & CLAMPS AS REQUIRED TO PROVIDE ADEQUATE SUPPORT AND SCREENING AS SHOWN ON PLANS.
5. FENCE TO WITHSTAND 80 MPH WINDS.
6. FENCE AND GATES AT REFUSE PAD TO INCLUDE PVC 'LOCK TOP' PRIVACY SLATS (WITHOUT WINGS) IN REDWOOD COLOR AS PROVIDED BY HOOVER FENCE CO. 1-800-355-2335 OR APPROVED EQUAL.
7. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

CHAIN LINK FENCE
SCALE: N.T.S.

5

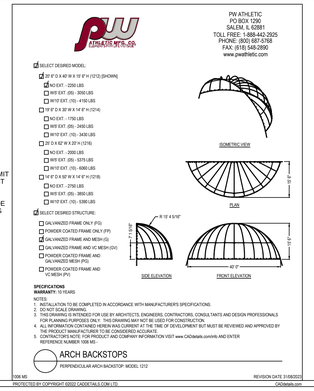
NOTE:
1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR REVIEW AND APPROVAL.
2. PROVIDE 42" DEEP,36" WIDE 3500 PSI CONCRETE FOOTING FOR ALL POSTS.



HOODED ARCH BACKSTOP
SCALE: N.T.S.

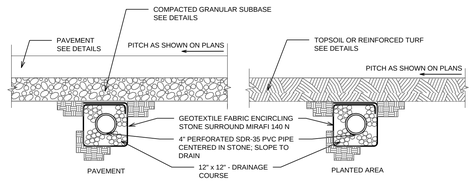
6

NOTE:
1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR REVIEW AND APPROVAL.
2. PROVIDE 42" DEEP,36" WIDE 3500 PSI CONCRETE FOOTING FOR ALL POSTS.



PERPENDICULAR ARCH BACKSTOP (ADD ALTERNATE)
SCALE: N.T.S.

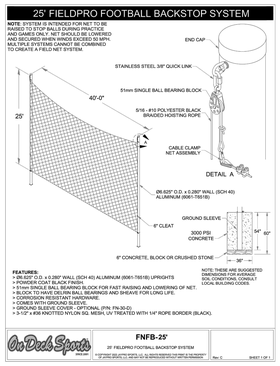
7



UNDERDRAIN
SCALE: N.T.S.

8

25' FIELDPRO FOOTBALL BACKSTOP SYSTEM



NOTE:
1. SAFETY NETTING WITH REMOVABLE POLES AND GROUND SLEEVES AS PROVIDED BY ON DECK SPORTS OR EQUAL AS APPROVED BY PROJECT ENGINEER.
2. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS STAMPED BY LICENSED PROFESSIONAL ENGINEER FOR POLES AND NETTING AND FOR GROUND SLEEVE INSTALLATION.
3. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

SAFETY NETTING SYSTEM
SCALE: N.T.S.

9

10

11

12

13

14

15

16

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

KG+D listen imagine build
KG+D ARCHITECTS, PC
285 MAIN STREET•MOUNT KISCO, NEW YORK 10549
P: 914.666.5900 KGDARCHITECTS.COM

ISSUE FOR PRICING - 90% CONSTRUCTION DOCUMENTS

SED Control No.
BE: 66-10-04-06-0-009-025
SB: 66-10-04-06-0-036-007

DTS • PROVIDENT Intelligent Land Use
DTS Provident Design Engineering, LLP
One North Broadway
White Plains, NY 10603
P: 914.428.0010
F: 914.428.0017
CA#: 0017846

Key Plan

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EXPIRES 1/31/24

No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

SITE DETAILS

Job No. 1006	Sheet Number SP-SB-3.1
Date 6/1/23	
Scale as shown	
Drawn / Checked MJS / GMS	

General Notes:

1 The purpose of these drawings is to show the structural work associated with the new mechanical unit support at the Chappaqua Central School District Middle Schools in Chappaqua, NY.
2 The work shown on these drawings has been designed in accordance with the structural requirements of the 2020 edition of the Building Code of New York State.
3 The structural components have been designed for the following loads:
   A. Uniform live load:
      Rooftop Dunnage 30 psf
   B. Roof loads:
      Snow:
      Ground snow load, p_g 30 psf
      Flat roof snow load, p_f 21 psf
      Exposure factor, C_e 1.0
      Importance factor, I_s 1.0
      Thermal factor, C_t 1.00
   C. Wind design data:
      Wind loads have been determined based on Section 1609.1.1 in accordance with ASCE 7-10, Chapters 26, 27, 29 and 30, Directional Procedure

      Risk category III
      Basic wind speed (3-second gust):
         Ultimate design wind speed, Vult 125 mph
         Nominal design wind speed, Vasd 97 mph
      Exposure B
   D. Earthquake design data:
      Risk category III
      Seismic importance factor, I_e: 1.00
      Mapped short period spectral response accelerations, S_s: 0.287g
      Mapped 1 second period spectral response accelerations, S_1: 0.061g
      Site class: D
   E. Other loads:
      Concentrated loads:
         Roof surfaces subject to maintenance workers 300 lbs
4 This structure has been designed to be self-supporting and stable after the work shown on these drawings has been completed. The stability of the structure prior to completion is solely the responsibility of the contractor. This responsibility extends to all related aspects of the construction activity including, but not limited to, erection methods, erection sequence, temporary bracing, forms, shoring, use of equipment, and similar construction procedures. Review of the construction by the engineer is for conformance with design aspects only, not to review the contractor's construction procedures. Lack of comment on the part of the engineer with regard to construction procedures is not to be interpreted as approval of those procedures.
5 Jobsite safety and construction procedures are solely the responsibility of the contractor. Review of the construction by the engineer is for conformance with design aspects only, not to review the contractor's provisions for job site safety. Lack of comment by the engineer is not to be interpreted as approval of those aspects of work.
6 Testing and inspection of structural steel, wood framing, and other work are described in the project "Statement of Special Inspections". The contractor shall review the "Statement of Special Inspections" and coordinate the scheduling of inspections with the special inspector. Uninspected work that required inspections may be rejected solely on that basis.
7 If faulty construction procedures, or material, result in defective work that requires additional engineering time to devise corrective measures, professional fees may be charged to the contractor at the standard hourly rate of additional services. Such fees may be withheld from the general contractor's payment.
8 Loads, openings and structure in any way related to requirements of other (non-structural) disciplines are shown for bidding purposes only. However, these plans do not show the full scope of openings, in roofs, floors and walls. For size and location of all openings, see architectural and mechanical drawings. Do not scale openings. The contractor shall obtain from the heating and ventilating, electrical, plumbing and other trades the final approved size and location of all openings, equipment and work to be provided for their trade for roofs, floors and walls, whether shown or not shown on structural drawings. Excess cost related to variation in requirements or equipment are not to be borne by the owner.
9 For any mechanical equipment weights used in design of supporting elements that are indicated on the drawings. Contractor shall notify the architect prior to installation of equipment if actual weight exceeds weight shown on drawings.
10 The contractor shall verify all dimensions, elevations and angles with architectural drawings and existing conditions before proceeding with any work.
11 The contractor shall field verify existing conditions before proceeding with any work. The contractor shall field verify all dimensions noted "±" that are indicated on the drawings.
12 The contractor and subcontractors shall obtain the latest copies of approved plans and surveys and they shall familiarize themselves thoroughly with these plans before commencing any work.
13 These drawings are supplemented by a detailed technical specification. The notes shown under certain categories of work are intended to summarize basic requirements.
14 Work shown as "Typical Details" apply throughout the project as required. Work shown as "Sections" shall be considered to apply for the same and similar conditions in the building.
15 Some details of the work are shown on the architectural drawings. A careful review and study of these details are necessary before the full scope of the work can be comprehended.
16 Do not scale drawings.

Codes and Standards References

1 Structural steel:
Design, fabrication and erection of structural steel shall conform to the "Specification for Structural Steel for Buildings" as adopted on June 22, 2010, by the American Institute of Steel Construction (AISC) and the 14th Edition of the AISC Steel Construction Manual.

Structural Steel Notes:

1 Design fabrication and erection of structural steel shall conform to the American Institute of Steel Construction's "Specification for Structural Steel for Buildings", as specified in the code reference section of these general notes.
2 Materials:
American standard shapes, angles,
Plates and bars: ASTM A 36
Welding electrode ASTM E 70xx, low hydrogen
3 All welding shall conform to American Welding Society's AWS D1.1 "Structural Welding Code-Steel" code for arc and gas welding and be performed by a certified welder in accordance with A.W.S. standards.
4 Structural steel shall be cleaned in accordance with the Steel Structures Painting Council Specification SP 3 for Power Tool Cleaning (except for steel exposed to weather).
5 For miscellaneous steel, see architectural drawings.
6 Existing steel surfaces to receive field welds shall be thoroughly cleaned and free from paint, rust, grease, etc.
7 Submittals to the engineer are required for certificates of compliance for structural steel and weld filler material prior to the fabrication of any steel
8 At the completion of fabrication, the fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the approved contract documents, as required by Section 1704.2 of the building code indicated at the beginning of these General Notes.

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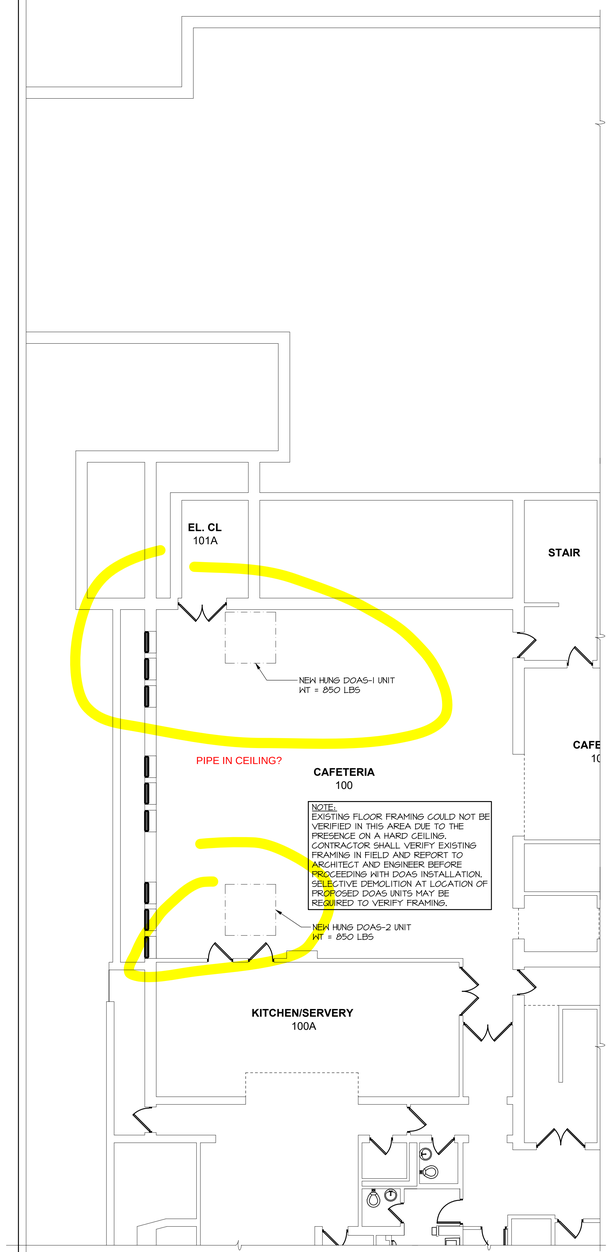
No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/01/2023	SCHEMATIC DESIGN

Sheet Title

GENERAL NOTES

Job No. 23039	Sheet Number S001
Date 8/24/2023	
Scale AS NOTED	
Drawn / Checked JM/SGL	

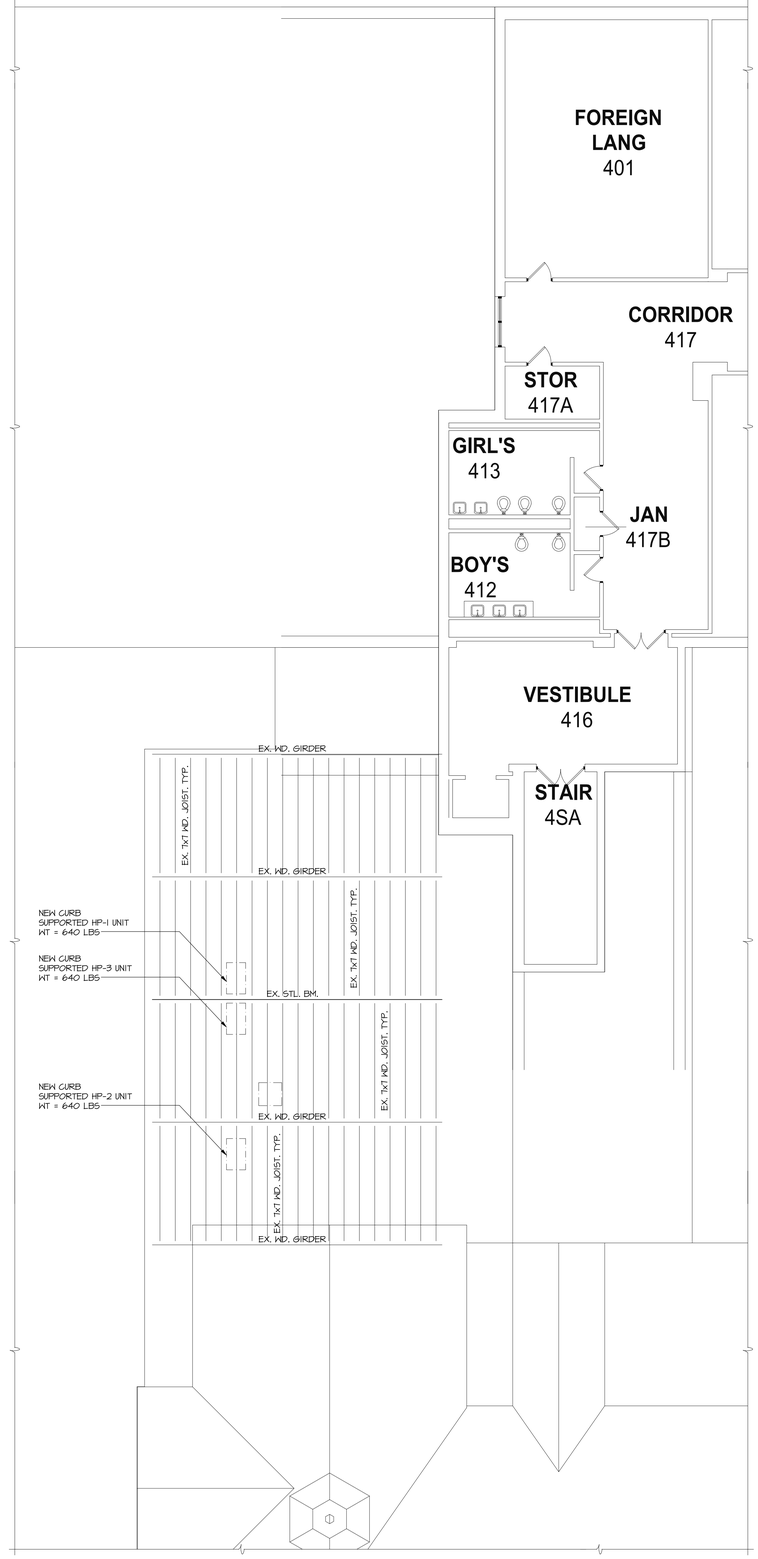


FIRST FLOOR HUNG UNITS

1/8" = 1'-0"

NORTH

- REFER TO GENERAL NOTES ON S001

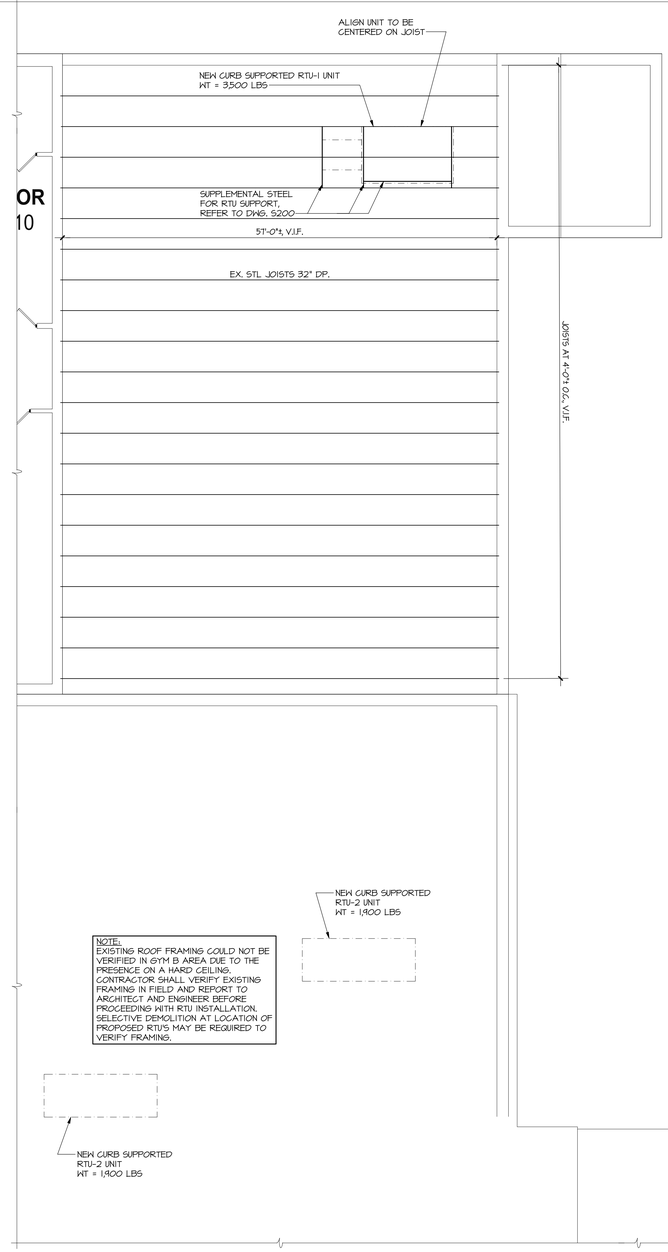


PARTIAL ROOF - AREA "B"

1/8" = 1'-0"

NORTH

- REFER TO GENERAL NOTES ON S001



PARTIAL ROOF - AREA "A"

1/8" = 1'-0"

NORTH

- REFER TO GENERAL NOTES ON S001
- REFER TO DWG. S200 FOR SUPPLEMENTAL STEEL FOR SUPPORT OF THE UNITS AND ROOF OPENINGS

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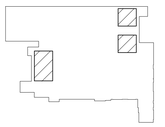
Key Plan
Robert E. Bell Middle School



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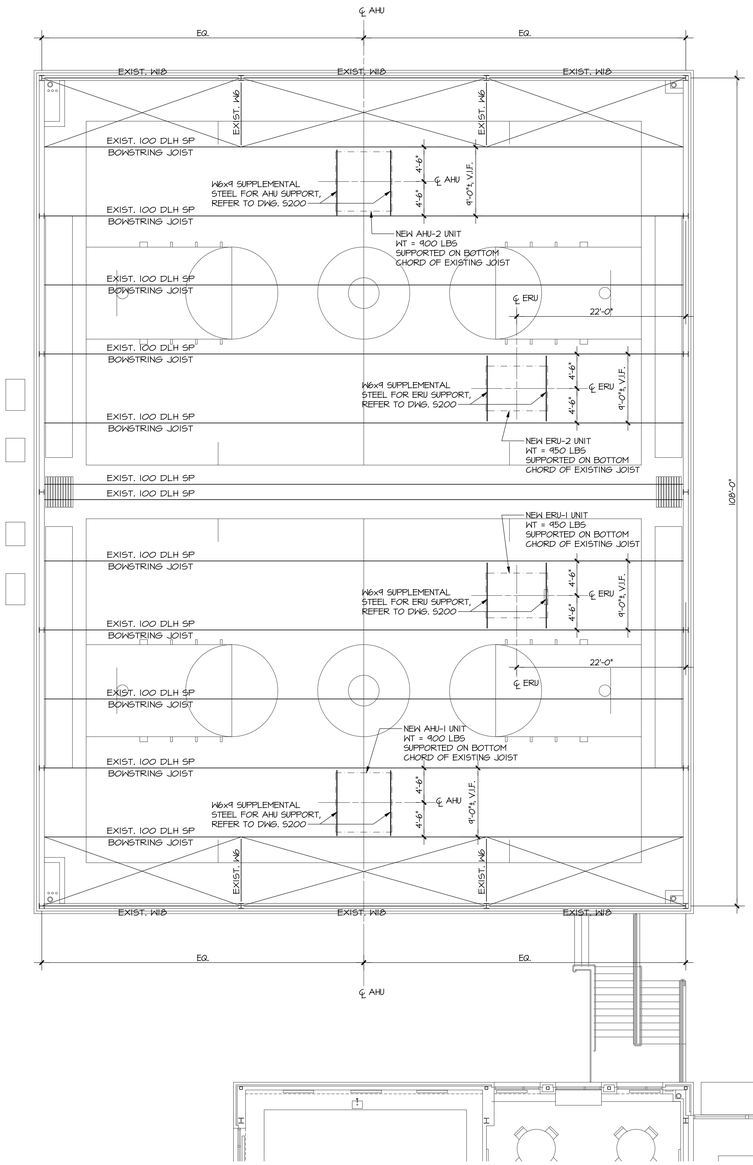
BELL MS PART ROOF AND FIRST FLOOR FRAMING PLANS

Job No. 23039	Sheet Number S101-BE
Date 8/24/2023	
Scale AS NOTED	
Drawn / Checked JM/SGL	



GYM ROOF FRAMING PLAN

1/8" = 1'-0"

NORTH

- REFER TO GENERAL NOTES ON S001
- EXISTING BOWSTRING JOISTS HAVE BEEN ANALYZED USING THE DESIGN INFORMATION PROVIDED ON THE ORIGINAL CONSTRUCTION DOCUMENTS PREPARED BY NACHMAN ENGINEERING AND DATED 8/06/2001. EXISTING BOWSTRING TRUSS SIZE INCLUDING DEPTH, PANEL POINT SPACING, CHORD AND WEB SIZES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR AND REPORTED TO THE ARCHITECT AND ENGINEER PRIOR TO INSTALLATION OF THE UNITS.

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Key Plan
Seven Bridges Middle School

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Sheet Title

SEVEN BRIDGES MS GYM ROOF FRAMING PLAN

Job No. 23039	Sheet Number S102-SB
Date 8/24/2023	
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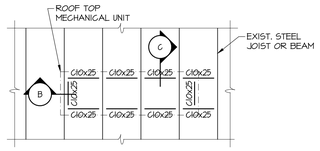
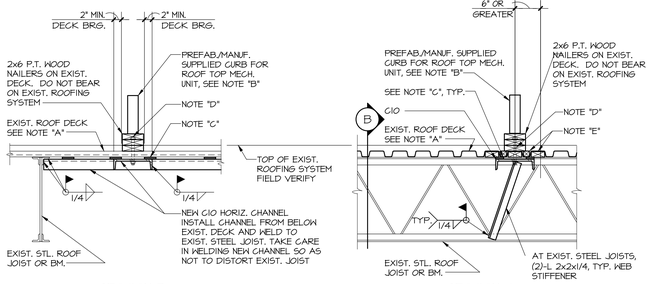
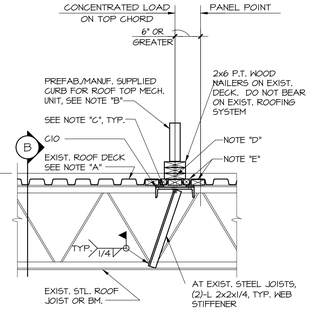
Drawn / Checked JM/SGL	



PLAN DETAIL A



SECTION B



SECTION C

NOTE "A":
EXISTING ROOF DECK: xx" METAL ROOF DECK. FIELD VERIFY.

NOTE "B":
SEE MECHANICAL DRAWINGS FOR CONNECTION OF CURB TO SUPPORTING STRUCTURE.

NOTE "C":
PROVIDE WELDED STEEL SHIMS AS REQUIRED BETWEEN HORIZONTAL CHANNEL AND EXISTING ROOF DECK

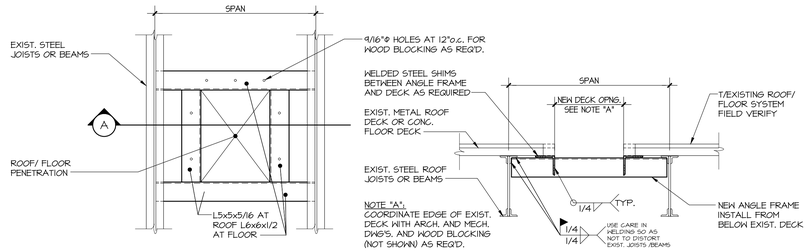
NOTE "D":
1/2"Ø x LENGTH AS REQ'D GALV. THREADED ANCHOR BOLTS AT 1'-0"o.c. DRILL THRU EXIST. ROOF DECK.

NOTE "E":
FILL DECK FLUTES (TOP AND BOTTOM) WITH 2x CONTINUOUS PRESERVATIVE TREATED WOOD BLOCKING.

TYPICAL ROOF TOP UNIT CURB ON EXIST. STEEL FRAMING DETAIL

NO SCALE

1 / S200



SECTION A

NOTES:

1. SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF ALL ROOF/ FLOOR PENETRATIONS.
2. WHEREVER POSSIBLE LOCATE SUPPORT POINTS OF FRAMES OVER TOP CHORD PANEL POINTS. SEE JOIST REINFORCING DETAIL FOR ADDITIONAL WEB MEMBERS.

TYP. ROOF/ FLOOR DECK PENETRATION DETAIL FOR EX. STEEL ROOF/ FLOOR FRAMING

NO SCALE

2 / S200

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Sheet Title

TYPICAL DETAILS

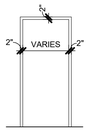
Job No. 23039	Sheet Number S200
Date 8/24/2023	
Scale AS NOTED	
Drawn / Checked JM/SGL	

DOOR SCHEDULE

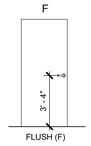
MARK	#	SIZE WI	SIZE HT	DOOR ELEV	DOOR MAT	DOOR FIN	FRAME MAT	FRAME FIN	FIRE RATING	SADDLE	HDWE SET	COMMENTS
BE-1	1	3' - 0"	7' - 0"	F	HM	P	HM	P	90	-	SE	
BE-2	1	3' - 0"	7' - 0"	F	HM	P	HM	P	-	-	SE	

NOTES:
1) DOORS, FRAMES & HARDWARE SHALL MATCH SIMILAR TO EXISTING COMPONENTS.
2) HARDWARE SHALL BE COMPATIBLE WITH OWNER'S SECURITY SYSTEM. COORDINATE w/ OWNER'S SECURITY VENDOR.
3) SEE SPEC SECTION 087101 FOR HARDWARE SET INFORMATION & TYPICAL HARDWARE NOTES.
ST: STORAGE HARDWARE SET

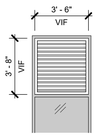
ABBREVIATIONS: AL- ALUMINUM; EX- EXISTING; FF- FACTORY FINISH; HDWE- HARDWARE SET; HM- HOLLOW METAL; P-PAINT; WD- WOOD



1 (SINGLE DOOR)



FLUSH (F)



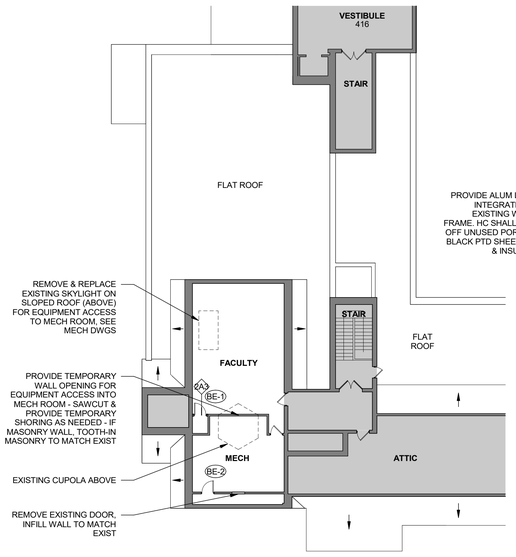
EXIST WINDOW, VIF

LOUVERS SHALL BE 4" DEEP ALUM. HORIZONTAL BLADE, STORM-PROOF, DRAINABLE, w/ 50% FREE AREA (MIN) IN PREMIUM (KYNAR) METALLIC (OR CUSTOM) COLOR SELECTED BY ARCHITECT. w/ BIRD SCREEN (SIM TO RUSKIN ELF375DX)

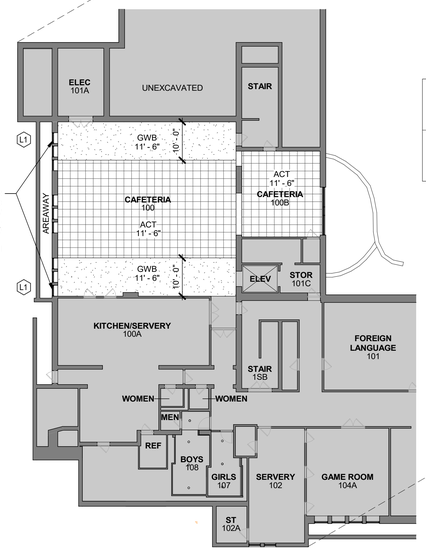
F FRAME TYPES 1/4" = 1'-0"

D DOOR TYPES 1/4" = 1'-0"

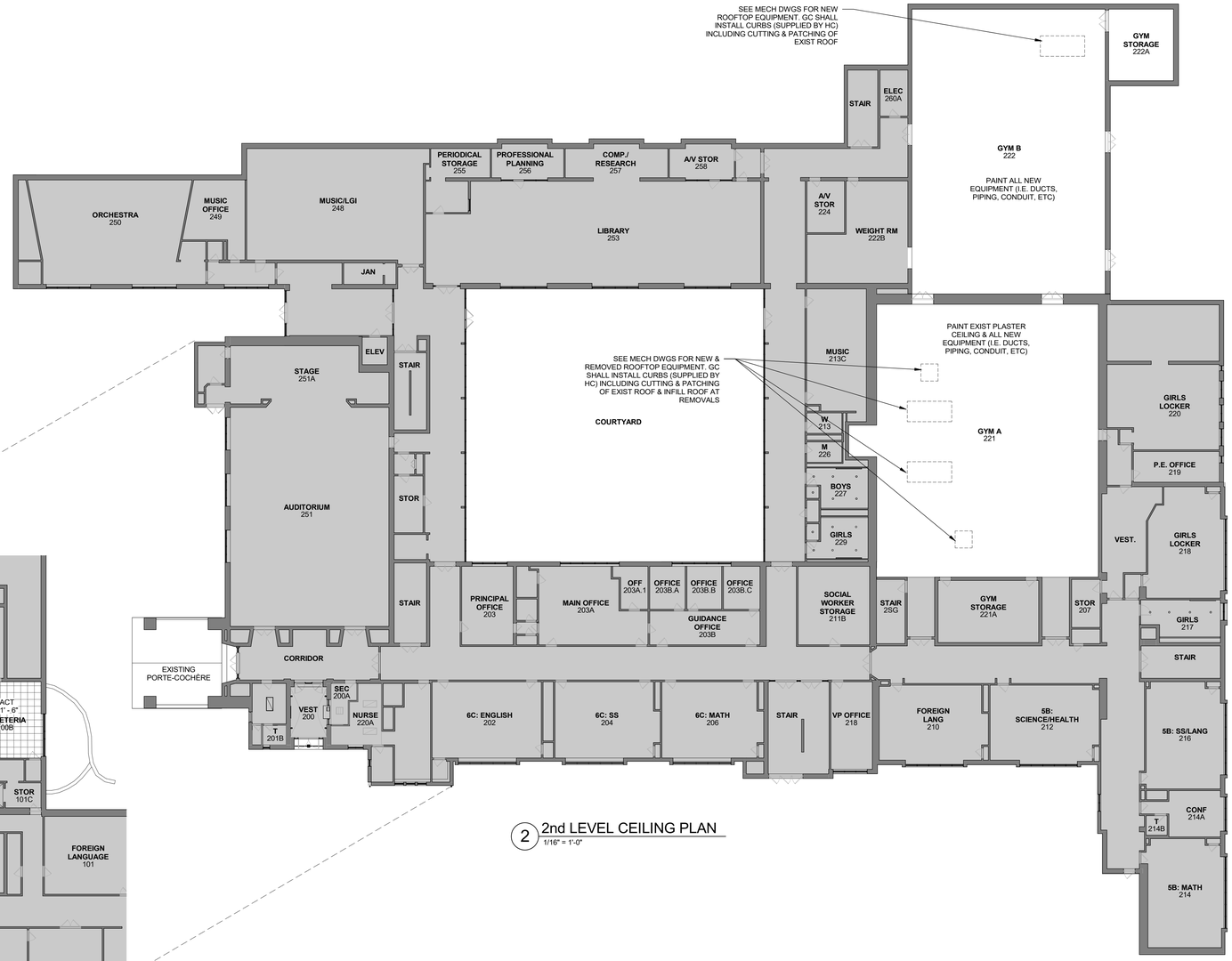
L1 LOUVER TYPE L1 1/4" = 1'-0"



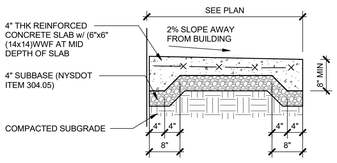
4 4th LEVEL PART PLAN
1/16" = 1'-0"



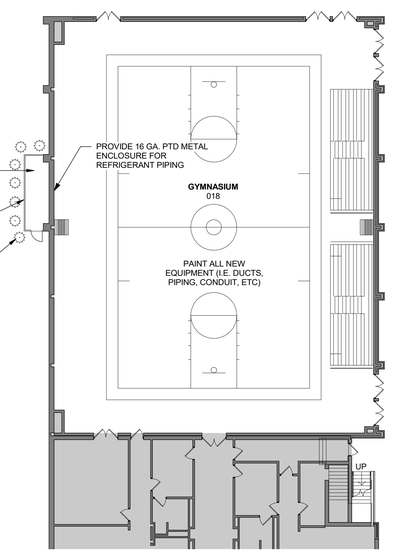
1 1st LEVEL CEILING PART PLAN
1/16" = 1'-0"



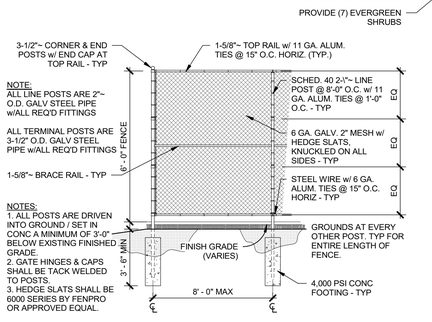
2 2nd LEVEL CEILING PLAN
1/16" = 1'-0"



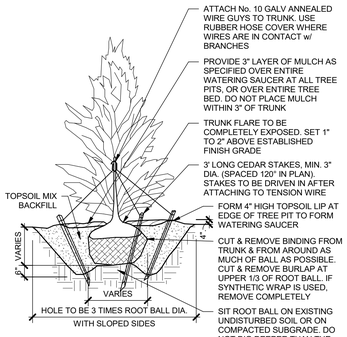
5 DETAIL @ CONCRETE PAD
3/4" = 1'-0"



SB 1st LEVEL PART PLAN - SEVEN BRIDGES
1/16" = 1'-0"



6 DETAIL @ FENCE PANELS
1/32" = 1'-0"



NOTE:
PROVIDE STAKING & GUYING FOR TREES PLANTED ON SLOPES GREATER THAN 3H: 1V, IN EXPOSED, WINDY AREAS & AS SPECIFIED BY LANDSCAPE ARCHITECT. GUY WIRES & STAKES SHALL BE REMOVED WITHIN 12 MONTHS OF PLANTING.

7 EVERGREEN TREE PLANTING DETAIL
3/8" = 1'-0"

2A- 2 hr FIRE RESISTIVE - UL #U419

DESIGN STC = 59
FIELD STC = 55 (MIN)

NOTE: ASSEMBLE PARTITION PER UNDERWRITERS LABORATORY FIRE RESISTANCE RATING REQUIREMENTS.

PARTITION NOTES

1. PROVIDE DEFLECTION TRACK AT TOP OF ALL PARTITIONS THAT EXTEND TO STRUCTURE ABOVE, (TYPICAL). PROVIDE FIRE-RATED DEFLECTION TRACK SYSTEM AT TOP OF ALL FIRE-RATED PARTITIONS.

2. SEE SPECIFICATIONS FOR FOR FIRESTOPPING REQUIREMENTS.

3. WHERE ACOUSTICAL BATT INSULATION IS USED IN PARTITIONS: SEAL AIRTIGHT w/ NON-HARDENING ACOUSTICAL SEALANT AT SUP, BOTTOM & SIDES. PARTITION MOUNTED ELECTRICAL BOXES SHOULD BE OFFSET MIN 24" (NOT BACK TO BACK) w/ PERIMETER OF BOXES SEALED AIR-TIGHT w/ NON-HARDENING ACOUSTICAL PUTTY PADS. PIPE & DUCT PENETRATIONS SHALL BE SLEEVED, PACKED w/ 10lb. DENSITY CLOSED CELL FOAM, & SEALED TO PARTITION w/ NON-HARDENING ACOUSTICAL SEALANT. FIRE RATED PARTITIONS TO RECEIVE FIRE RATED PUTTY PADS.

4. PROVIDE 'INSULHOLD' HANGERS OR EQ BATT RETAINING CLIPS HORIZONTALLY @ MAX 48" SPACING PER MFG SPECS IN ALL SINGLE SIDED (GYP BD) FURRING PARTITIONS.

5. COORDINATE REQUIRED STUD GAUGE WITH STRUCTURAL DRAWINGS & SPECIFICATIONS - TYP

6. WHEN (2) LAYERS OF TYPE 'X' GYP BD ARE REQUIRED, OUTER LAYER SHALL BE 5/8" THK ABUSE RESISTANT TYPE.

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Key Plan
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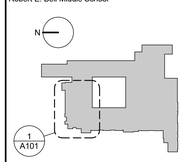

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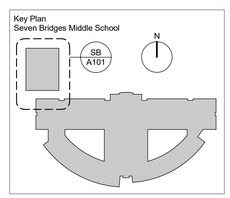
ROBERT E. BELL & SEVEN BRIDGES PLANS & DETAILS

Key Plan
Seven Bridges Middle School



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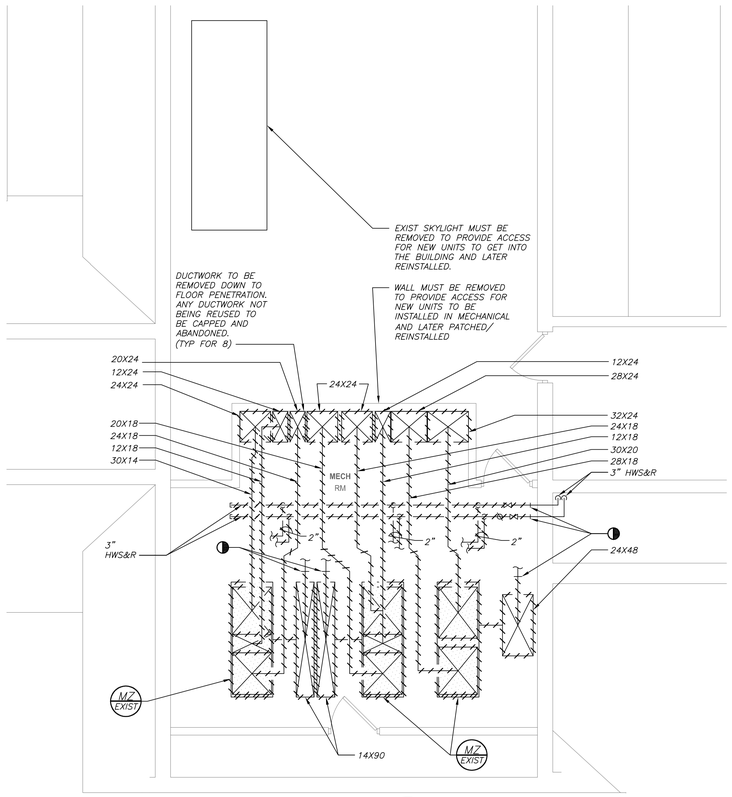
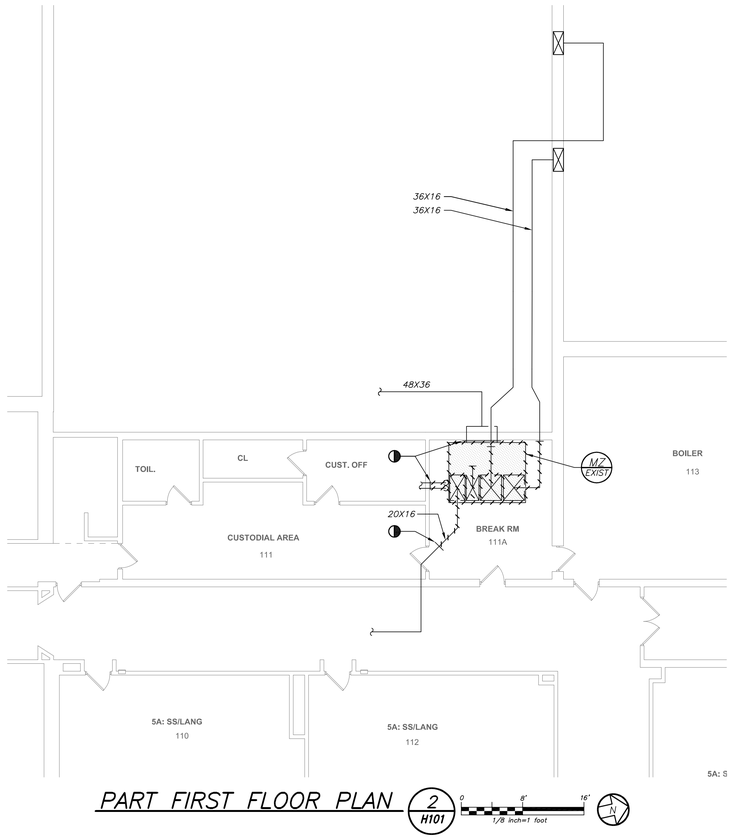
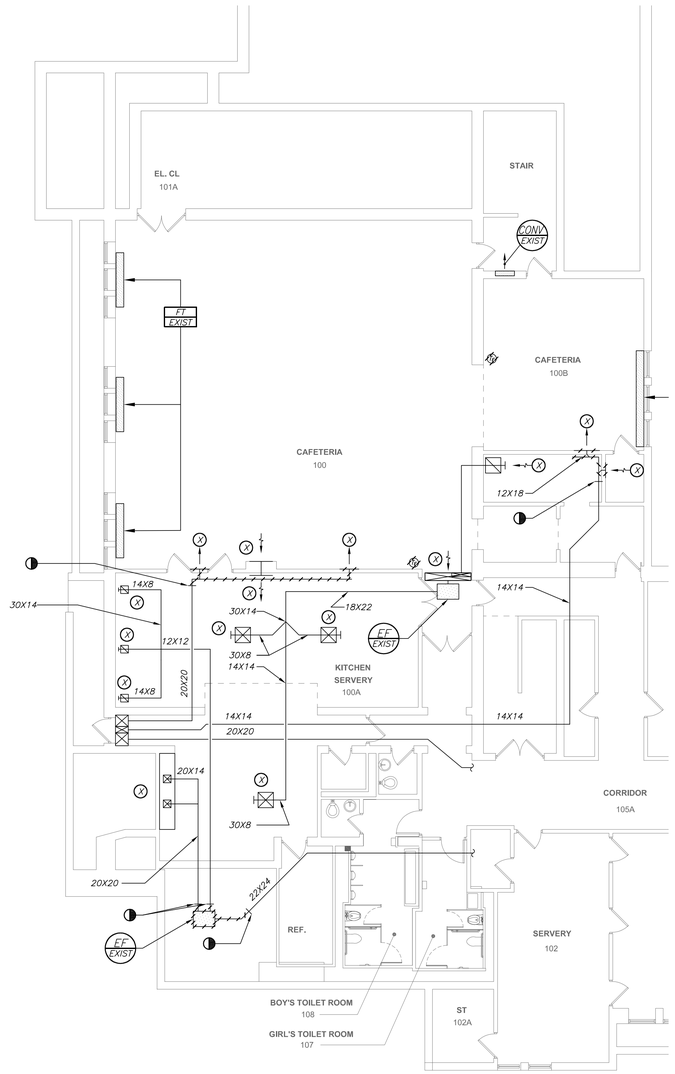


PART ATTIC PLAN 3/H101 — 1/4 inch=1 foot



PART FIRST FLOOR PLAN 2/H101 — 1/8 inch=1 foot



PART FIRST FLOOR PLAN 1/H101 — 1/8 inch=1 foot

REMOVAL NOTES:

1. THE SCOPE OF REMOVAL SHOWN ON "REMOVALS" DRAWINGS IS DIAGRAMMATIC ONLY AND INDICATES THE INTENT OF THE WORK TO BE PERFORMED AND NOT THE COMPLETE SCOPE OF DEMOLITION AND/OR REMOVAL WORK. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO REMOVE ANY RELATED MECHANICAL DEVICES EVEN IF NOT SPECIFICALLY INDICATED TO BE REMOVED ON THESE DRAWINGS IN ORDER TO ACCOMMODATE NEW WORK.
2. DEVICES SHOWN CROSS HATCHED ON DRAWINGS ARE ITEMS TO BE REMOVED. ANY DEVICES REMOVED SHALL INCLUDE (BUT SHALL NOT BE LIMITED TO) THE REMOVAL OF ALL ASSOCIATED PIPING, CONTROLS, ETC. THAT ARE NOT INCORPORATED IN THE NEW LAYOUT, UNTIL SUCH REMOVAL IS COMPLETE. THIS CONTRACTOR SHALL PERFORM ALL WORK REQUIRED TO INSURE CONTINUITY OF SERVICE TO EXISTING REMAINING EQUIPMENT. NO EXTRAS RELATING TO THE SCOPE OF WORK DESCRIBED WILL BE ALLOWED.
3. EQUIPMENT, PIPING, ETC., REQUIRED TO RECONNECT SHALL BE INSTALLED CONCEALED WITHIN THE NEW SUSPENDED CEILINGS, PARTITIONS AND/OR WALLS, FLOORS, NO SURFACE MOUNTED OR EXPOSED EQUIPMENT, PIPING, ETC., SHALL BE PERMITTED, UNLESS SPECIFICALLY INDICATED.
4. ALL ITEMS TO BE REMOVED SHALL BE REVIEWED WITH THE OWNER PRIOR TO REMOVAL. OWNER SHALL HAVE FIRST SALVAGE RIGHTS. ITEMS THE OWNER WISHES TO KEEP SHALL BE REMOVED WITH CARE AND STORED AS DIRECTED BY OWNER. ITEMS THE OWNER DOES NOT WISH TO KEEP SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.

HVAC LEGEND

	EXISTING DUCTWORK, EQUIPMENT, ETC. TO REMAIN
	EXISTING DUCTWORK, EQUIPMENT, ETC. TO BE REMOVED
	POINT OF CHANGE IN DUCT SIZE NEW DUCTWORK 1" THERMAL ACOUSTIC LINING–DUCT SIZES ON PLANS ARE CLEAR INSIDE DIMENSIONS
	FLEXIBLE CONNECTION NEW DUCTWORK POINT OF CHANGE IN DUCT SIZE
	SQUARE DUCT TURN WITH TURNING VANES
	EXISTING CEILING DIFFUSER
	EXISTING CEILING REGISTER
	TYPE –SEE SCHEDULE NEW 4–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE NEW 3–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE NEW 2–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE CEILING EXHAUST/RETURN REGISTER CFM
	TYPE–SEE SCHEDULE REGISTER/DIFFUSER IDENTIFICATION CFM
	DUCT MTD. MANUAL AIR VOLUME DAMPER (W/LOCKING DEVICE)
	MOTORIZED AIR VOLUME DAMPER (W/ACCESS DOOR)
	FSD & AD FIRE DAMPER (U.L. APPROVED) & ACCESS DOOR
	FSD & AD FIRE/SMOKE DAMPER (U.L. APPROVED) & ACCESS DOOR
HWS	HOT WATER HEATING SUPPLY PIPING
HWR	HOT WATER RETURN PIPING
ELPS	EXISTING LOW PRESSURE STEAM PIPING
ECR	EXISTING CONDENSATE RETURN PIPING
L	LIQUID REFRIGERANT PIPING
S	SUCTION REFRIGERANT PIPING
HG	HOT GAS REFRIGERANT PIPING
CD	CONDENSATE DRAIN PIPING
	FLOW DIRECTION WITHIN PIPE CONNECTION TO EQUIPMENT ABOVE
	GATE VALVE (HORIZONTAL/VERTICAL)
	COMBINATION BALANCING & SHUT–OFF VALVE (CIRCUIT SETTER)
	2 – WAY CONTROL VALVE
	CHECK VALVES
	PIPE CONNS. (BOTTOM; TOP 45 OR 90; PIPE UP)
	EXPANSION JOINT, ANCHOR AND GUIDES
DOAS EXIST	DEDICATED OUTDOOR AIR SYSTEM IDENTIFICATION
RTU EXIST	ROOFTOP UNIT IDENTIFICATION
VRF EXIST	OUTDOOR VRF HEAT PUMP UNIT IDENTIFICATION
FCU EXIST	INDOOR VRF FAN COIL UNIT IDENTIFICATION
HWC EXIST	HOT WATER COIL IDENTIFICATION
EF EXIST	EXHAUST FAN IDENTIFICATION
AHU EXIST	AIR HANDLING UNIT IDENTIFICATION
MZ EXIST	MULTIZONE UNIT IDENTIFICATION
EF EXIST	EXISTING EXHAUST FAN IDENTIFICATION
MZ EXIST	EXISTING MULTIZONE UNIT IDENTIFICATION
UH EXIST	EXISTING HEATING AND VENTILATION UNIT IDENTIFICATION
CONV EXIST	EXISTING CONVENCTOR IDENTIFICATION
RAD EXIST	EXISTING RADIATOR IDENTIFICATION
UH EXIST	EXISTING UNIT HEATER IDENTIFICATION
TF EXIST	EXISTING TRANSFER FAN IDENTIFICATION
FT-#	TYPE NEW FIN TUBE RADIATION IDENTIFICATION ELEMENT LENGTH
FT EXIST	TYPE EXISTING FIN TUBE RADIATION IDENTIFICATION
TS	TO CONTROLLED ITEM WALL MTD.(5'–2"±A.F.F–U.O.N.) TEMPERATURE SENSOR
TE	EXISTING WALL MTD. TEMPERATURE SENSOR
CO2	WALL MTD. CARBON DIOXIDE SENSOR
	DOOR UNDERCUT
CD	CEILING DIFFUSER
CR	CEILING REGISTER
TR	TOP WALL REGISTER
CFM	CUBIC FEET PER MINUTE
CV	MOTORIZED CONTROL VALVE
PFRE	PRE–FINISHED RISER ENCLOSURE
AFF	ABOVE FINISHED FLOOR
OA/FAI	OUTSIDE (FRESH) AIR INTAKE
HVAC	HEATING, VENTILATING, AIR CONDITIONING CONTRACTOR
FC	FLEXIBLE CONNECTION
FSC	FULL SIZE CONNECTION
FSD/AD	FIRE/SMOKE DAMPER / ACCESS DOOR
AD	ACCESS DOOR
FD	FIRE DAMPER
TD	TRANSFER DUCT
MD	MOTORIZED DAMPER
WMG	WIRE MESH GRILLE
VIF	VERIFY IN FIELD
	SECTION/DETAIL/ELEVATION/PART PLAN NUMBER DRAWING NUMBER SECTION/ELEVATION IDENTIFICATION

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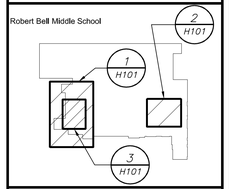

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2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL LEGEND, NOTES, & PART FIRST & ATTIC PLAN

Job No. 2023-1028	Sheet Number H101-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

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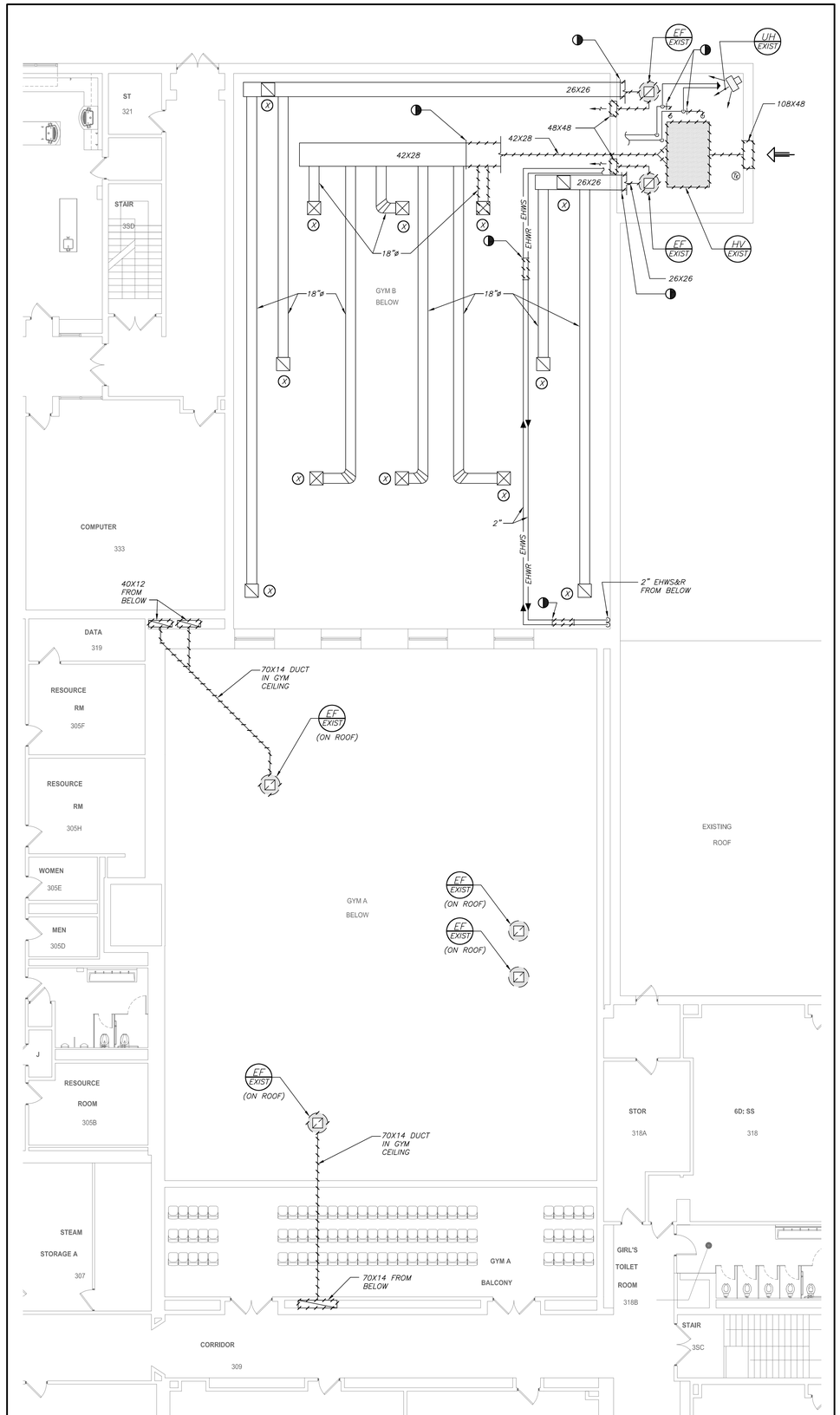
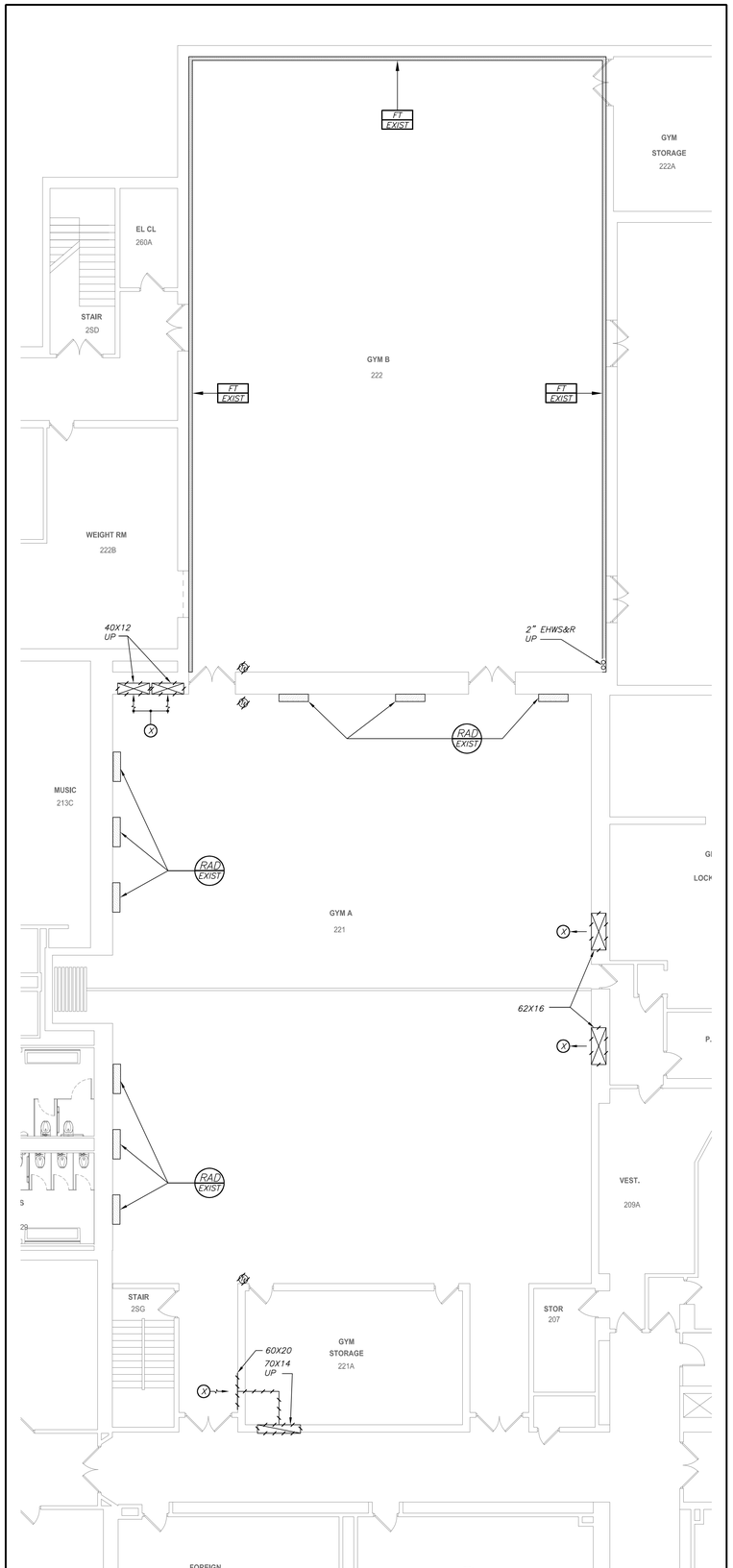


PART THIRD FLOOR PLAN 2/H102 — 1/8 inch=1 foot



PART SECOND FLOOR PLAN 1/H102 — 1/8 inch=1 foot

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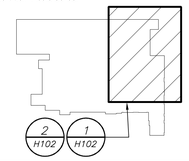

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Sheet Title

ROBERT E. BELL PART SECOND AND THIRD FLOOR PLANS

Job No. 2023-1028	Sheet Number H102-BE
Date 08/31/2023	
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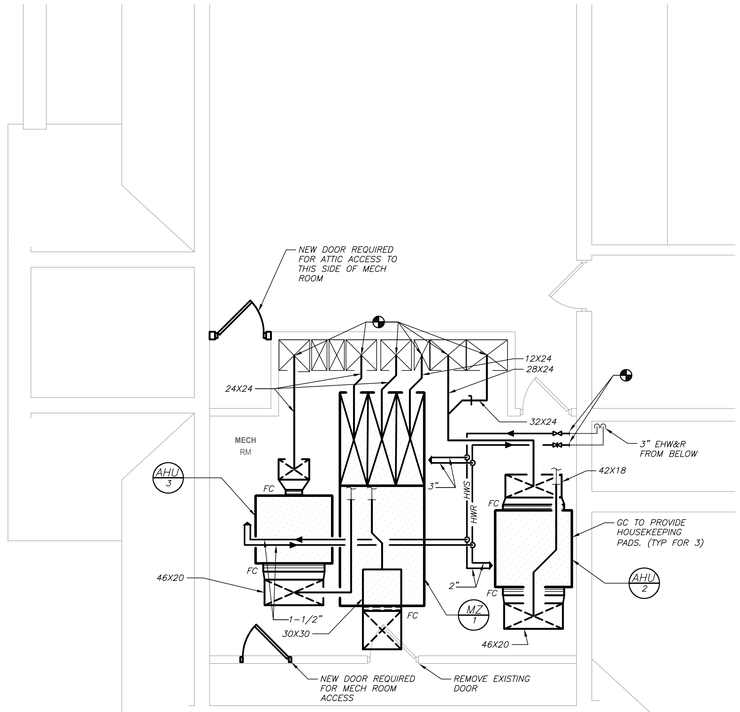
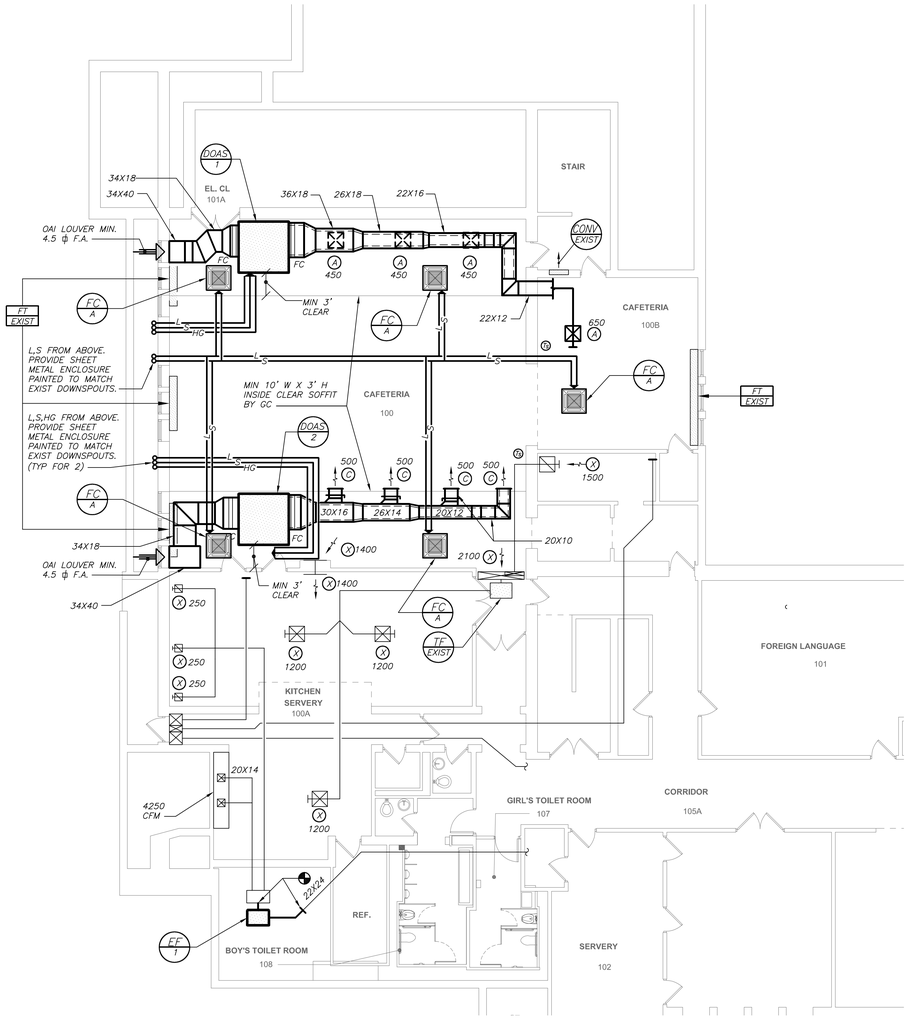


PART ATTIC PLAN 3 H101 — 0, 4', 8' — 1/4 inch=1 foot

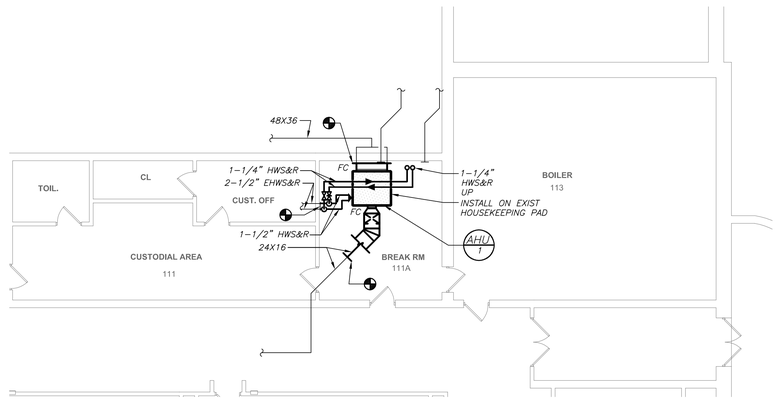
VRF SYSTEM:
THE CONTRACTOR SHALL RETAIN THE SERVICES OF THE MANUFACTURER'S REPRESENTATIVE FOR PURPOSES OF PROVIDING REFRIGERANT PIPING SIZING. CONTRACTOR SHALL PROVIDE PIPING FROM RESPECTIVE OUTDOOR UNIT TO EACH NEW INDOOR UNIT, FOR A COMPLETE AND OPERABLE SYSTEM.

CONDENSATE DRAIN SYSTEM:
THE CONTRACTOR SHALL PROVIDE CONDENSATE PIPING FROM EACH RESPECTIVE INDOOR EVAPORATOR UNIT, COIL, AIR HANDLER, FC, ERU, DOAS, AND RTU TO THE NEAREST FLOOR DRAIN, JANITOR'S SINK, INDIRECT WASTE, OR ROOF DRAIN, FOR A COMPLETER AND OPERABLE SYSTEM. CONDENSATE DRAIN PIPING SHALL BE A MINIMUM 1" ROUND.

IN ALL AREAS WHERE CEILINGS ARE NOT BEING REPLACED, REMOVE TILES AND GRID AS REQUIRED TO PERFORM WORK AND REINSTALL FOR "AS NEW" CONDITION. CLEAN ALL EXISTING DIFFUSERS/REGISTERS TO REMAIN.



PART FIRST FLOOR PLAN 2 H101 — 0, 8', 16' — 1/8 inch=1 foot



PART FIRST FLOOR PLAN 2 H101 — 0, 8', 16' — 1/8 inch=1 foot

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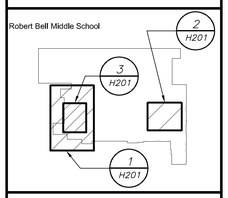

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Sheet Title

ROBERT E. BELL PART FIRST AND ATTIC PLANS

Job No. 2023-1028	Sheet Number H201-BE
Date 08/31/2023	
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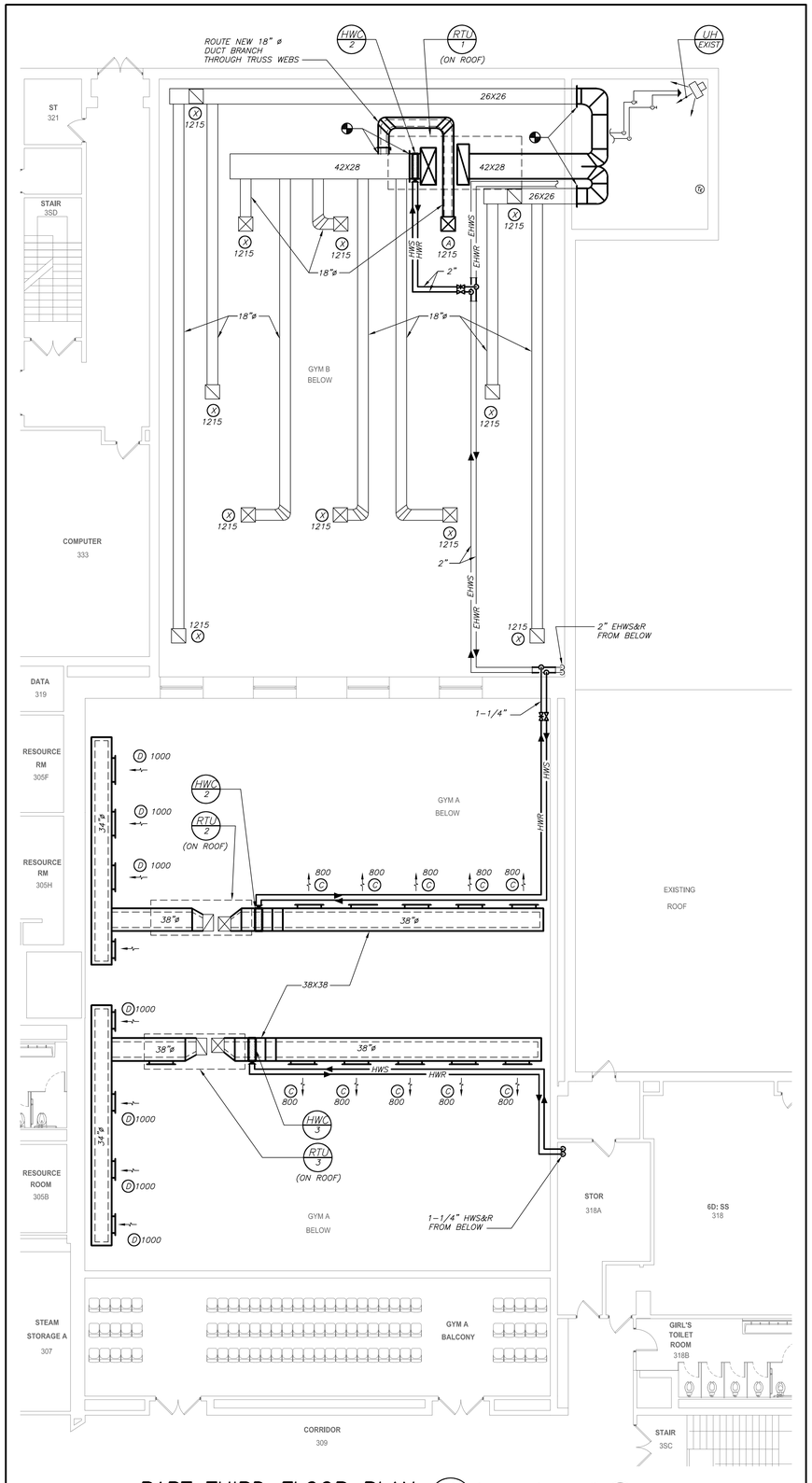
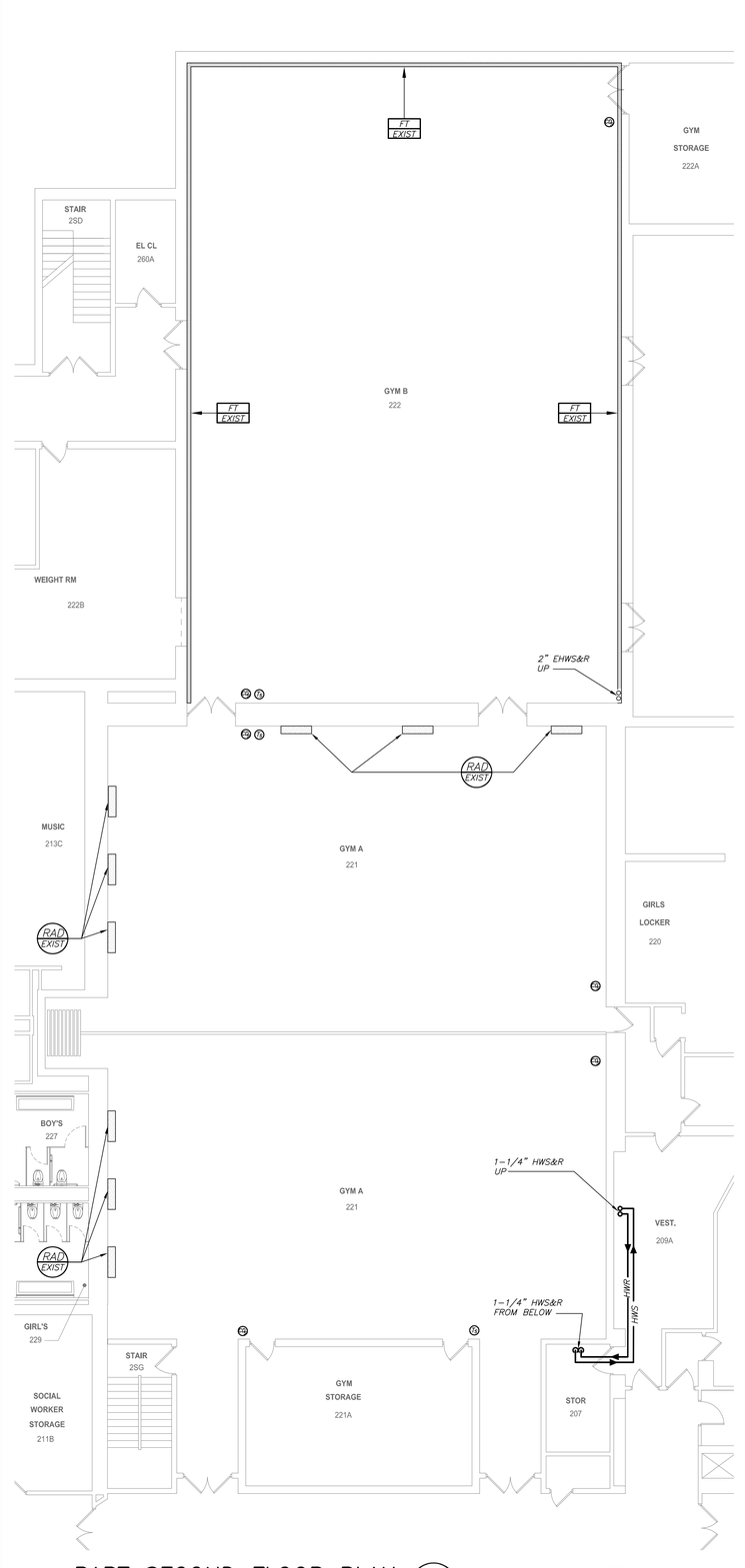


PART THIRD FLOOR PLAN 2 H202 — 1/8 inch=1 foot



PART SECOND FLOOR PLAN 1 H202 — 1/8 inch=1 foot

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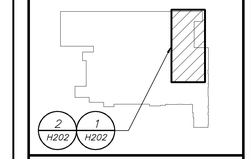

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ROBERT E. BELL PART FIRST, SECOND & THIRD FLOOR PLANS

Job No. 2023-1028	Sheet Number H202-BE
Date 06/10/2023	
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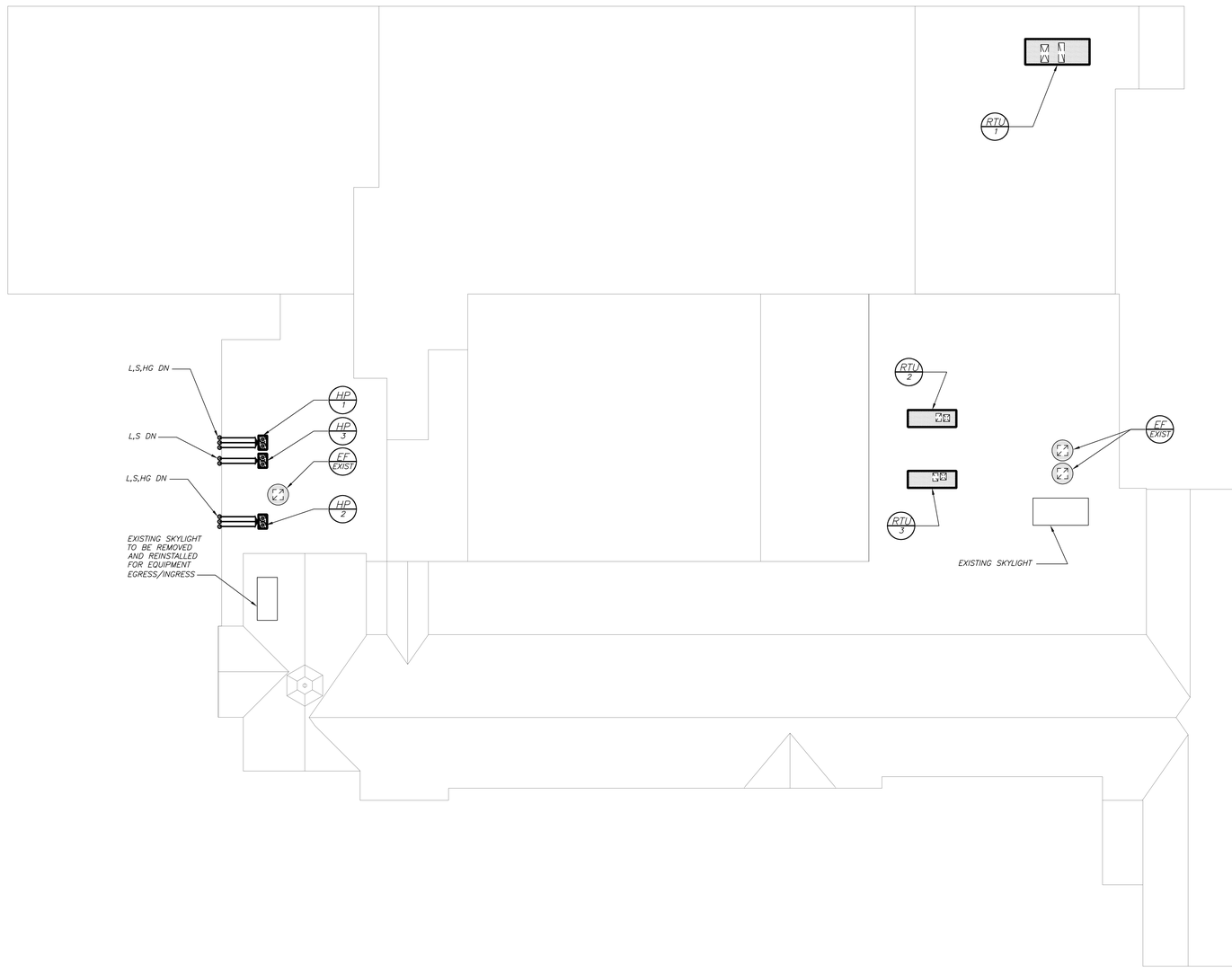

ROOF PLAN 1 H203

0 16' 32'

1/16 inch=1 foot

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Professional Seal

No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL ROOF PLAN

Job No. 2023-1028
Date 08/31/2023
Scale AS NOTED
Drawn / Checked BGA/BGA

Sheet Number

H203-BE

SCHEDULE OF PACKAGED ROOFTOP UNITS

MARK	SERVICE	LOCATION	MODEL No. (1)	SUPPLY FAN DATA: CFM	MOTOR HP	RPM	E.S.P. IN. WG	RET FAN DATA: CFM	E.S.P. IN. WG	HOT WATER HEATING COIL DATA	DX COOLING DATA: TOTAL COOLING CAP. (MBH)	SENS. COOLING CAP. (MBH)	ENT. TEMP. (DB°F/WB°F)	LVG. TEMP. (DB°F/WB°F)	EER	IEER	FILTER TYPE	ENERGY RECOVERY ACCESSORY DATA: MODEL No.(1)	OA CFM	HP	EXH CFM	HP	ELECTRICAL DATA: MCA	MOP	ELECTRICAL SERVICE	PHYSICAL DATA: LxHxW(in.)/WGT (lbs)	REMARKS
RTU 1	GYM B 222	ROOF	PV20CODP2A1CAT17E2	7300	7.5	1122	1.75	7000	1.75	HWC 1	REFER TO SCHEDULE OF HOT WATER COILS	247	176	77/65	55/53	10.9	13.5	4" MERV 13	VRO36A26L2AL41	2800	2.0	2500	2.0	118.3+19	150+20	208/3/60	224x58x89/3,500	REFER TO 2 3 4 5 6 7
RTU 2	GYM A 221	ROOF	XP120C00R2A6BCA4A2	4000	3.0	1091	1.0	4000	1.0	HWC 2	REFER TO SCHEDULE OF HOT WATER COILS	122	90	77/64	56/54	11.0	14.5	4" MERV 13	VRO20A12H2AL41	1400	1.5	1400	1.5	57.6+9.2	70+12	208/3/60	169x51x59/1,900	REFER TO 2 3 4 5 6 7
RTU 3	GYM A 221	ROOF	XP120C00R2A6BCA4A2	4000	3.0	1091	1.0	4000	1.0	HWC 3	REFER TO SCHEDULE OF HOT WATER COILS	122	90	77/64	56/54	11.0	14.5	4" MERV 13	VRO20A12H2AL41	1400	1.5	1400	1.5	57.6+9.2	70+12	208/3/60	169x51x59/1,900	REFER TO 2 3 4 5 6 7

NOTES
1. AS MANUFACTURED BY "TEMPMASTER".
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. DESIGN AIR CONDITIONS: SUMMER: OA (95°F/75°F) RA (75°F/63°F); WINTER: OA (10°F) RA (70°F).
4. PROVIDE PACKAGED ROOFTOP UNIT WITH STAGED COOLING, MOTORIZED CONTROL DAMPERS, DAMPER END SWITCHES, 100% ENTHALPY ECONOMIZER CONTROLS, FROST PROTECTION, MODULATING HOT GAS REHEAT, DUCT MOUNTED HW COIL, DIRTY FILTER CONTACTS, HIGH STATIC BELT DRIVE BLOWER, DISCONNECT SWITCH, INTEGRAL VFD'S, ENERGY RECOVERY VENTILATOR ACCESSORY, DEMAND CONTROL VENTILATION, POWERED CONVENIENCE OUTLET, PHASE PROTECTION, DRAIN PANS, HINGED ACCESS PANELS, AND BACNET COMPATIBLE AUTOMATED CONTROLS.
5. FURNISH 14" HIGH ROOF CURB FOR GC INSTALLATION.
6. PROVIDE ENERGY RECOVERY VENTILATOR ACCESSORY WITH ENTHALPY WHEEL (AS NOTED), LOW AMBIENT KIT, MOTORIZED DAMPERS, AND PRESSURE SENSOR. ENERGY RECOVERY VENTILATOR ACCESSORY REQUIRES SEPARATE POWER CONNECTION.
7. INDICATED EQUIPMENT DESIGNATIONS ARE FOR USE IN CONSTRUCTION ONLY. CONTRACTOR SHALL COORDINATE WITH OWNER ON DESIRED FINAL TAG IDENTIFICATION/NUMBERING/LETTERING. OWNER APPROVED DESIGNATIONS SHALL BE USED IN BMS PROGRAMMING AND ON PERMANENT EQUIPMENT IDENTIFICATION TAGS. AS-BUILT DRAWINGS SHALL BE UPDATED WITH FINAL IDENTIFICATION TAG DESIGNATIONS.

SCHEDULE OF EXHAUST FANS

MARK	SERVICE	LOCATION	MODEL No. (1)	TYPE	CFM	EXT. S.P. IN H_2O	RPM	MOTOR HP	ELECTRIC V/PH/HZ	SIZE (IN)	WEIGHT (LBS.)	REMARKS
EF 1	KITCHEN	KITCHEN MECH	USF-22-B6	DIRECT DRIVE CENTRIFUGAL	5000	1.75	1086	2	208/1/60	50LX42WX47H	425	REFER TO 2 3 4

NOTES
1. AS MANUFACTURED BY "GREENHECK".
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE DISCONNECT SWITCH, VFD, VIBRATION ISOLATORS, AND NAMEPLATE IDENTIFYING FAN MARK, SERVICE, MODEL NO., CFM, RPM, HP, AND ELECTRICAL SERVICE
4. INDICATED EQUIPMENT DESIGNATIONS ARE FOR USE IN CONSTRUCTION ONLY. CONTRACTOR SHALL COORDINATE WITH OWNER ON DESIRED FINAL TAG IDENTIFICATION/NUMBERING/LETTERING. OWNER APPROVED DESIGNATIONS SHALL BE USED IN BMS PROGRAMMING AND ON PERMANENT EQUIPMENT IDENTIFICATION TAGS. AS-BUILT DRAWINGS SHALL BE UPDATED WITH FINAL IDENTIFICATION TAG DESIGNATIONS.

SCHEDULE OF DEDICATED OUTDOOR AIR SYSTEM UNITS

MARK	SERVICE	LOCATION	MODEL No. (1)	AIRFLOW CONDITIONS: O.A. CFM	ESP. IN. WC	HP	DX COIL CLG DATA: CAPACITY (MBH) TOTAL/SEN.	E.A.T. °F DB/WB	L.A.T. °F DB/WB	DX COIL HTG DATA: CAPACITY (MBH)	E.A.T. °F DB	L.A.T. °F DB	ELEC PRE HTG COIL DATA: CAPACITY (KW)	E.A.T. °F DB	L.A.T. °F DB	FILTER: OA FILTERS TYPE / SIZE	ELECTRICAL DATA: VOLTAGE	MCA	MOCP	DIMENSIONS: L	W	H	WEIGHT LBS	REMARKS
ODAS 1	CAFETERIA/ KITCHEN	CAFETERIA 100	ARND203DCR4	2,000	1.5	1.0	143.1	85.6	95/75	53/53	59.9	44	70	10	-2	14	MERV 13/ 2"	208/1/60	7.3 + 48.1	15 + 70	80	78	24	850	REFER TO 2 3 4 5 6
ODAS 2	CAFETERIA/ KITCHEN	KITCHEN SERVERY 100A	ARND203DCR4	2,000	1.5	1.0	143.1	85.6	95/75	53/53	59.9	44	70	10	-1	14	MERV 13/ 2"	208/1/60	7.3 + 48.1	15 + 70	80	78	24	850	REFER TO 2 3 4 5 6

NOTES
1. AS MANUFACTURED BY "LG". (KLIMA NEW YORK 914 255-4390)
2. DESIGN AIR CONDITION: SUMMER O.A. (95°F/75°F) R.A. (75°F/63°F); WINTER O.A. (10°F/10°F) R.A. (70°F/53°F).
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE MANUFACTURER'S SUPERVISION FOR FIELD INSTALLATION AND START-UP.
4. REFRIGERANT R-410A.
5. PROVIDE INDOOR 100% OA DOAS UNIT WITH PRE HEATING ELECTRIC COIL, MOTORIZED CONTROL DAMPERS, DAMPER END SWITCHES, 100% ENTHALPY ECONOMIZER CONTROLS, DIRTY FILTER CONTACTS, DISCONNECT SWITCH, ECM MOTOR, FILTERS (AS NOTED), DIRECT EXPANSION COIL FOR HEAT PUMP DUTY, HOT GAS REHEAT, STAINLESS STEEL DRAIN PAN, DISCHARGE AIR CONTROL/SENSORS, BACNET COMPATIBLE AUTOMATED CONTROLS (AS NOTED).
6. INDICATED EQUIPMENT DESIGNATIONS ARE FOR USE IN CONSTRUCTION ONLY. CONTRACTOR SHALL COORDINATE WITH OWNER ON DESIRED FINAL TAG IDENTIFICATION/NUMBERING/LETTERING. OWNER APPROVED DESIGNATIONS SHALL BE USED IN BMS PROGRAMMING AND ON PERMANENT EQUIPMENT IDENTIFICATION TAGS. AS-BUILT DRAWINGS SHALL BE UPDATED WITH FINAL IDENTIFICATION TAG DESIGNATIONS.

SCHEDULE OF VRF HEAT RECOVERY INDOOR UNITS

MARK	LOCATION	MODEL No. (1)	INDOOR AIR HANDLER INFORMATION: SUPPLY FAN DATA: HIGH CFM	MOTOR (AMPS)	ELECTRIC SERVICE	COOLING COIL DATA (2): TOTAL CAP. BTU/HR	SENSIBLE CAP. BTU/HR	ENT. AIR TEMP. DB°/WB°	HEATING: TOTAL CAP. BTU/HR	ENT. AIR TEMP.	REMARKS
EC 4	WALL MTD	ARNU3635VA4	918	1.02	208/1/60	35,500	25,900	80 / 67	37,000	70	REFER TO 2 3 4 5 6

NOTES
1. AS MANUFACTURED BY "LG."
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. BASED ON A.R.I. CERTIFIED COIL SELECTIONS; REFRIGERANT R-410A.
4. PROVIDE FACTORY MOUNTED INTEGRAL CONDENSATE PUMP, CHECK VALVE, ANTI SWEAT SLEEVE AND AUTO SHUTDOWN OVERFLOW SWITCH.
5. PROVIDE MOUNTING HARDWARE, VIBRATION ISOLATORS, AND DISCONNECT.
6. THE VRF SYSTEM SHALL BE ABLE TO INTEGRATE WITH THE BUILDING MANAGEMENT SYSTEM VIA BACNET IP GATEWAY. THIS GATEWAY CONVERTS BETWEEN BACNET IP OR MODBUS TCP PROTOCOL, AND RS-485 LGAP (LG AIRCON PROTOCOL) ALLOWING THIRD PARTY CONTROL AND MONITORING OF THE LG A/C SYSTEM, OR LONWORKS GATEWAYS. VRF MANUFACTURER SHALL ASSIST ATC CONTRACTOR IN INTEGRATION OF VRF SYSTEM WITH BMS.

SCHEDULE OF DUCT MOUNTED HOT WATER HEATING COILS

MARK	SERVICE	HTG. CAPACITY BTU/HR	E.A.T. (°F)	L.A.T. (°F)	E.W.T. (°F)	L.W.T. (°F)	GPM	CFM	COIL FACE AREA SQ.FT.	COIL FACE VELOC.FPM	ROWS	REMARKS
HWC 1	RTU 1	280,000	60	95	180	160	28	7,300	–	–	–	REFER TO 1 2 3 4 5 6 7 8
HWC 2	RTU 2	150,000	60	95	180	160	15	4,000	–	–	–	REFER TO 1 2 3 4 5 6 7 8
HWC 3	RTU 3	150,000	60	95	180	160	15	4,000	–	–	–	REFER TO 1 2 3 4 5 6 7 8

NOTES
1. AS MANUFACTURED BY "NATIONWIDE COILS INC."
2. PROVIDE PRESSURE DROP ACROSS COIL SHALL NOT EXCEED 0.30" S.P.
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
4. COIL SHALL BE MINIMUM 2 ROWS WITH MINIMUM OF 8 FINS PER INCH.
5. 5/8" TUBE AND ALUMINUM FINS.
6. GALVANIZED PITCHED CASING.
7. THE WATER COIL IS SIZED TO HANDLE OUTDOOR AIR QUANTITIES AT 100 PERCENT (WITH ENERGY RECOVERY UNIT IN OPERATION) OF OCCUPANCY WITHOUT HAVING TO RESORT TO CLOSING OUTDOOR AIR INTAKE DAMPERS ON A "DESIGN HEATING DAY" TO PREVENT FREEZE-UP.
8. BASED ON ENTERING/LEAVING WATER TEMPERATURES HW 180/160°.

SCHEDULE OF AIR HANDLING UNITS

MARK	LOCATION	MODEL No.	CFM	MIN. O.A. CFM	HEATING DATA (2): CAPACITY MBH	ROWS	FILTER TYPE	MOTOR H.P.	ELEC. SERV.	PHYSICAL DATA DIMENSION / WEIGHT	REMARKS
AHU 1	BREAK ROOM 11A	HCA40AAAAH2AGABACCBDABAM	3500	3500	328	2	4" MERV13	3.0	208/3/60	53"Lx60"Dx34"H/300LBS	REFER TO 1 3 4 5
AHU 2	ATTIC MECH ROOM	AVS040E-R-FHV	4700	4700	328	2	4" MERV13	3.0	208/3/60	59"Lx59"Dx38"H/420LBS	REFER TO 2 3 4 6
AHU 3	ATTIC MECH ROOM	HCA40AAAAH2AGABACCBDABAM	4000	4000	328	2	4" MERV13	3.0	208/3/60	53"Lx60"Dx34"H/300LBS	REFER TO 1 3 4 5

NOTES
1. AS MANUFACTURED BY "MAGICAIRE".
2. AS MANUFACTURED BY "VTS".
3. BASED ON ENTERING/LEAVING WATER TEMPERATURES HW 180/160°.
4. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
5. UNIT SHALL INCLUDE HW HEATING COIL, ECM HIGH STAIC VARIABLE SPEED MOTOR, NON-FUSED DISCONNECT SWITCH, 4" MERV 13 FILTERS, STAINLESS STEEL DRAIN PAN, FIELD INSTALLED DDC CONTROL PACKAGE, AND BACNet CONTROLLER. LH AND RH CONNECTIONS TO BE COORDINATED IN FIELD.
6. UNIT SHALL INCLUDE HW HEATING COIL, VFD, NON-FUSED DISCONNECT SWITCH, 4" MERV 13 FILTERS, STAINLESS STEEL DRAIN PAN, FIELD INSTALLED DDC CONTROL PACKAGE, AND BACNet CONTROLLER. LH AND RH CONNECTIONS TO BE COORDINATED IN FIELD.

SCHEDULE OF REGISTERS AND DIFFUSERS

MARK	TYPE	SERVICE	MODEL No. (1)	DIRECTION DISCHARGE	DAMPER TYPE	FINISH	REMARKS
A	CEILING DIFFUSER	SUPPLY	SCD	4-WAY	OPPOSED BLADE	PER ARCH.	REFER TO 2 4 5
B	CEILING REGISTER	RETURN	635	–			REFER TO 2 3 6
C	SIDEWALL REGISTER	SUPPLY	625	2-WAY			REFER TO 2 4 5
D	SIDEWALL REGISTER	RETURN	635	–			REFER TO 2 3 6

NOTES
1. AS MANUFACTURED BY "PRICE".
2. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
3. PROVIDE CABLE OPERATED DAMPERS IN UN-ACCESSIBLE AREAS.
4. PROVIDE MOUNTING FRAME COMPATIBLE W/ MOUNTING SURFACE. COORDINATE ALL BORDER TYPES, COLORS, FINISHES, AND DIMENSIONS WITH ARCHITECT.

5. SUPPLY NECK SIZE PER CFM RANGE (NOT TO EXCEED 500 fpm)									6. RETURN NECK SIZE PER CFM RANGE (NOT TO EXCEED 675 fpm)								
50 TO 99	100 TO 299	300 TO 499	500 TO 799	800 TO 1199	1200 TO 1499	1500 TO 1999	2000 TO 2399		50 TO 149	150 TO 249	250 TO 399	400 TO 599	600 TO 799	800 TO 1099	1100 TO 1199	1200 TO 2399	
6x6	9x9	12x12	15x15	18x18	21X21	24X24	6x6		8X8	10X10	12X12	14X14	16X16	18X18	24X24		

SCHEDULE OF VRF DUCTLESS AIR SOURCE HEAT RECOVERY OUTDOOR UNITS

MARK	SERVICE	LOCATION	MODEL No. (1)	CAPACITY: COOLING CAPACITY BTU/HR	HEATING CAPACITY BTU/HR	PHYSICAL DATA: DxWxH (IN)	WEIGHT (LBS)	ELECTRICAL INFORMATION: V/PH/HZ	MCA	MOCP	EER	COP	REMARKS
HP 1	ODAS 1	ROOF	MULTI V5 ARUM144 BTE5	144,000	162,000	30x49x67	666	208/3/60	51.1	70	12.1	3.52	REFER TO 2 3 4 5 6 7
HP 2	ODAS 2	ROOF	MULTI V5 ARUM144 BTE5	144,000	162,000	30x49x67	666	208/3/60	51.1	70	12.1	3.52	REFER TO 2 3 4 5 6 7
HP 3	CAFETERIA	ROOF	MULTI V5 ARUM168 BTE5	168,000	189,000	30x49x67	666	208/3/60	53.6	70	11.7	3.57	REFER TO 2 3 4 5 6 7

NOTES
1. AS MANUFACTURED BY "LG.".
2. BASED ON A.R.I. CERTIFIED COIL SELECTIONS; REFRIGERANT R-410A.
3. INSTALL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE DC INVERTER COMPRESSOR SPEED CONTROL BASED ON SYSTEM LOAD.
5. PROVIDE PROGRAMMABLE THERMOSTAT, LOW AMBIENT CONTROL, HARD START, CRANKCASE HEATER, DISCONNECT SWITCH. THE VRF SYSTEM SHALL BE ABLE TO INTEGRATE WITH THE BUILDING MANAGEMENT SYSTEM VIA BACNET IP GATEWAY. THIS GATEWAY CONVERTS BETWEEN BACNET IP OR MODBUS TCP PROTOCOL, AND RS-485 LGAP (LG AIRCON PROTOCOL) ALLOWING THIRD PARTY CONTROL AND MONITORING OF THE LG A/C SYSTEM, OR LONWORKS GATEWAYSVRF MANUFACTURER SHALL ASSIST ATC CONTRACTOR IN INTEGRATION OF VRF SYSTEM WITH BMS..
6. FURNISH RAILS FOR GC INSTALLATION.
7. INDICATED EQUIPMENT DESIGNATIONS ARE FOR USE IN CONSTRUCTION ONLY. CONTRACTOR SHALL COORDINATE WITH OWNER ON DESIRED FINAL TAG IDENTIFICATION/NUMBERING/LETTERING. OWNER APPROVED DESIGNATIONS SHALL BE USED IN BMS PROGRAMMING AND ON PERMANENT EQUIPMENT IDENTIFICATION TAGS. AS-BUILT DRAWINGS SHALL BE UPDATED WITH FINAL IDENTIFICATION TAG DESIGNATIONS.

SCHEDULE OF MINIMUM VENTILATION ROOM FLOW RATES

ROOM NAME/NUMBER	OCCUPANCY CATEGORY	A: ROOM AREA (SQ.FT.)	B: PEOPLE DENSITY (#P/1000 SQ.FT.)	C: PEOPLE OUTDOOR AIR FLOW RATE (CFM/PERSON)	D: AREA OUTDOOR AIR FLOW RATE IN BREATHING ZONE (CFM/SQ.FT.)	E: EXHAUST AIR FLOW RATE (CFM/SQ.FT.)	F: NUMBER OF PEOPLE (A×B)÷1000=#P	G: OUTDOOR AIR FLOW RATE WITHOUT ZONE EFFECTIVENESS FACTOR (F×C)+(A×D)=CFM	H: ZONE AIR DISTRIBUTION EFFECTIVENESS FACTOR	I: MINIMUM ROOM VENTILATION AIR FLOW RATE G÷H=CFM	MINIMUM EXHAUST AIR FLOW RATE A×E=CFM
CAFETERIA / 100	CAFETERIA/FAST-FOOD DINING	2200	100	7.5	0.18	0	220	2046	0.8	2558	0
CAFETERIA / 100B	CAFETERIA/FAST-FOOD DINING	500	100	7.5	0.18	0	50	465	0.8	581	0
UPPER GYM A / 221	GYM, SPORTS ARENA (PLAY AREA)	2700	7	20	0.18	0.5	19	866	0.8	1083	1350
LOWER GYM A / 221	GYM, SPORTS ARENA (PLAY AREA)	2700	7	20	0.18	0.5	19	866	0.8	1083	1350
GYM B / 222	GYM, SPORTS ARENA (PLAY AREA)	4800	7	20	0.18	0.5	34	1544	0.8	1930	2400

SCHEDULE OF MULTI-ZONE UNITS

MARK	SERVICE	LOCATION	O.A. CFM	MODEL No. (1)	UNIT ZONES: NO.	SERVICE	CFM	SUPPLY FAN DATA: CFM	EXT. S.P. IN. WG	FAN RPM	MOTOR HP	ELECTRIC SERVICE	MCA	MOCP	HEATING COIL DATA: TOTAL CAP. MBH	ENT. AIR TEMP	LVG. AIR TEMP	FILTER DATA: No.	SIZE	TYPE	REMARKS
MZ 1	AUDITORIUM	ATTIC MECH ROOM	9000	PAI-57X66	1	AUDITORIUM	3750	9000	2.0	2039	20.0	208/3/60	61.8	110	1,074	-10	84	8	4"	MERV13	REFER TO 2 3 4
					2	AUDITORIUM	3750														
					3	STAGE	1500														

NOTES
1. AS MANUFACTURED BY "PACE".
2. BASED ON 180° F E.W.T., 160° F L.W.T.
3. UNIT ARRANGED FOR ECONOMIZER AIR CONTROL.
4. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

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Robert Bell Middle School

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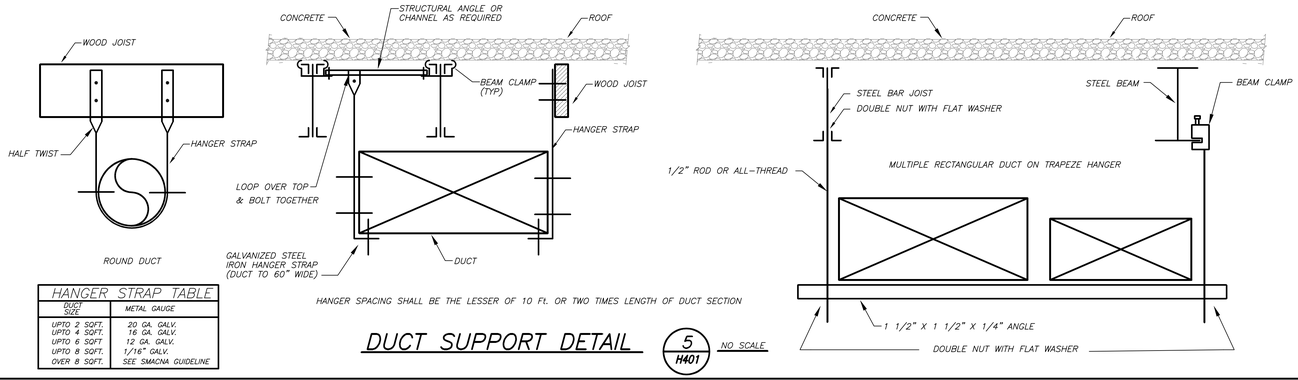
Professional Seal

No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL SCHEDULES

Job No. 2023-1028	Sheet Number H301-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

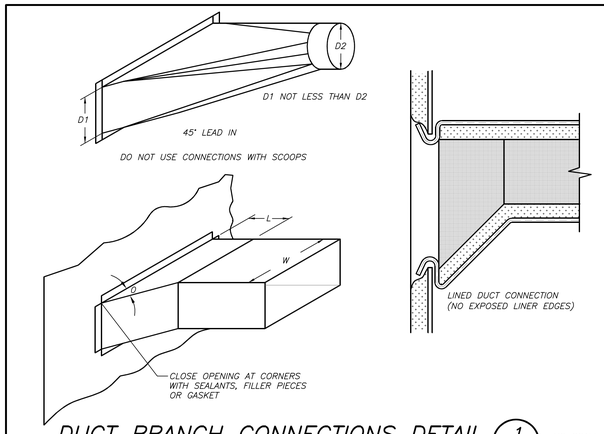


HANGER STRAP TABLE	
DUCT SIZE	METAL GAUGE
UPTO 2 SQFT.	20 GA. GALV.
UPTO 4 SQFT.	16 GA. GALV.
UPTO 6 SQFT	12 GA. GALV.
UPTO 8 SQFT.	1/16" GALV.
OVER 8 SQFT.	SEE SMACNA GUIDELINE

HANGER SPACING SHALL BE THE LESSER OF 10 Ft. OR TWO TIMES LENGTH OF DUCT SECTION

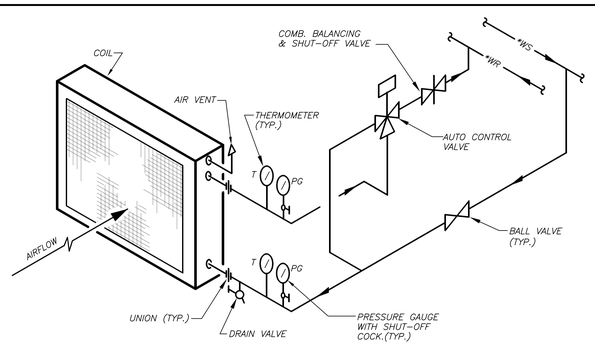
DUCT SUPPORT DETAIL

5 / H401 — NO SCALE



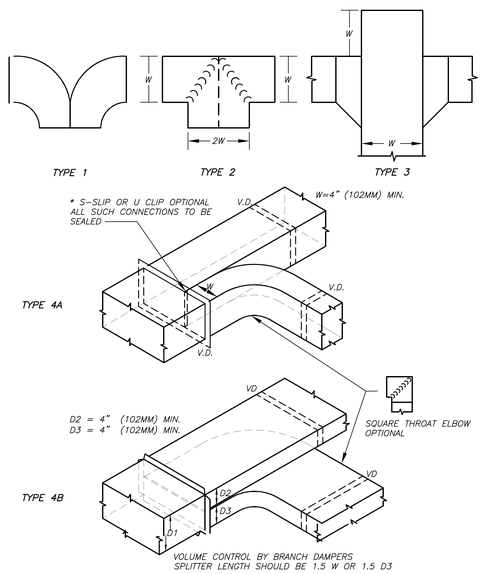
DUCT BRANCH CONNECTIONS DETAIL

1 / H401 — NO SCALE



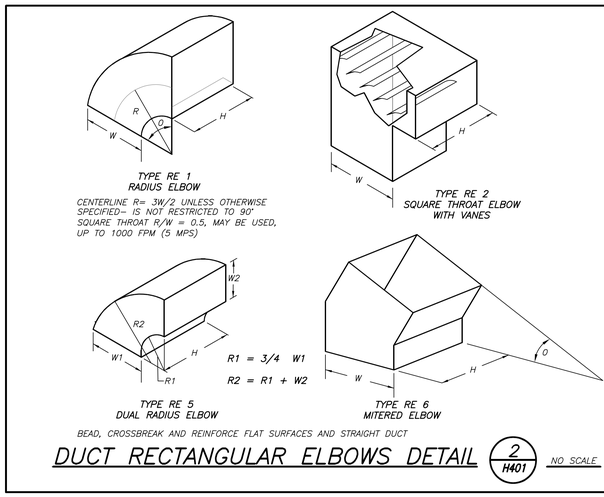
COIL PIPING CONNECTION DETAIL

8 / H401 — NO SCALE



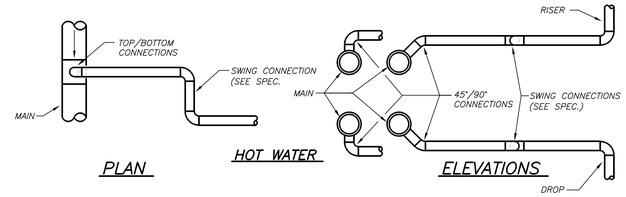
DUCT DIVIDED FLOW BRANCHES DETAIL

6 / H401 — NO SCALE



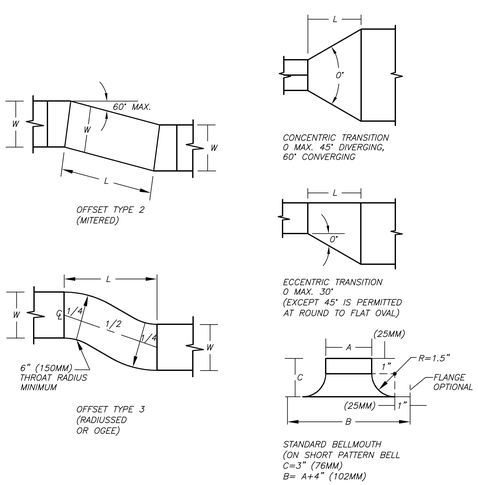
DUCT RECTANGULAR ELBOWS DETAIL

2 / H401 — NO SCALE



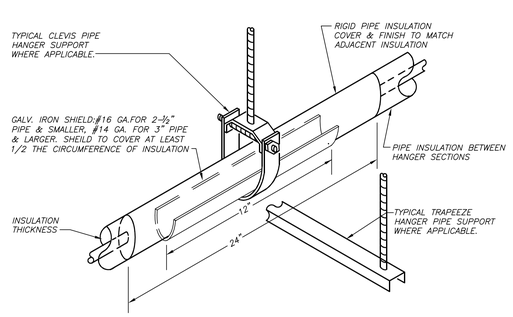
DETAIL OF PIPING BRANCH CONNECTION

9 / H401 — NO SCALE



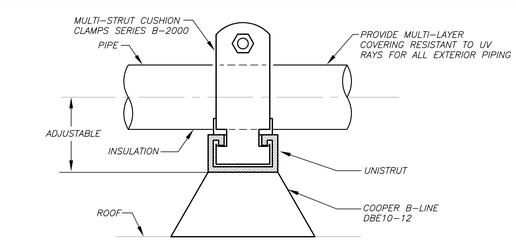
DUCT OFFSETS AND TRANSITIONS DETAIL

7 / H401 — NO SCALE



INSULATED PIPE HANGER DETAIL

3 / H401 — NO SCALE



PIPING SUPPORT AT ROOF DETAIL

4 / H401 — NO SCALE

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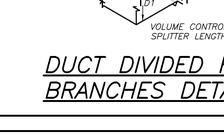
Robert Bell Middle School



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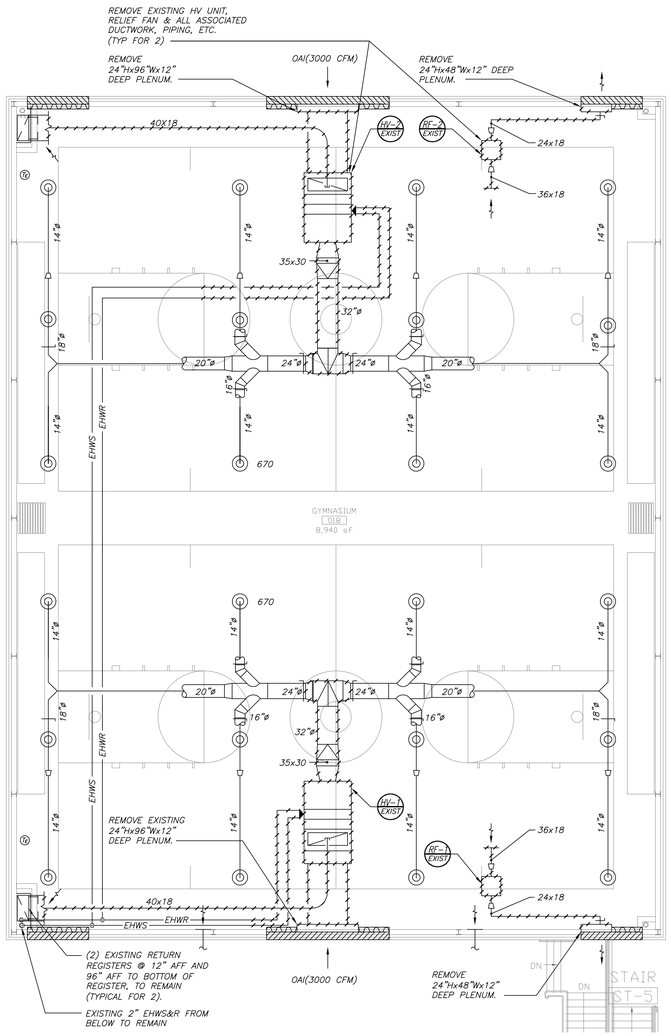
Professional Seal

No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

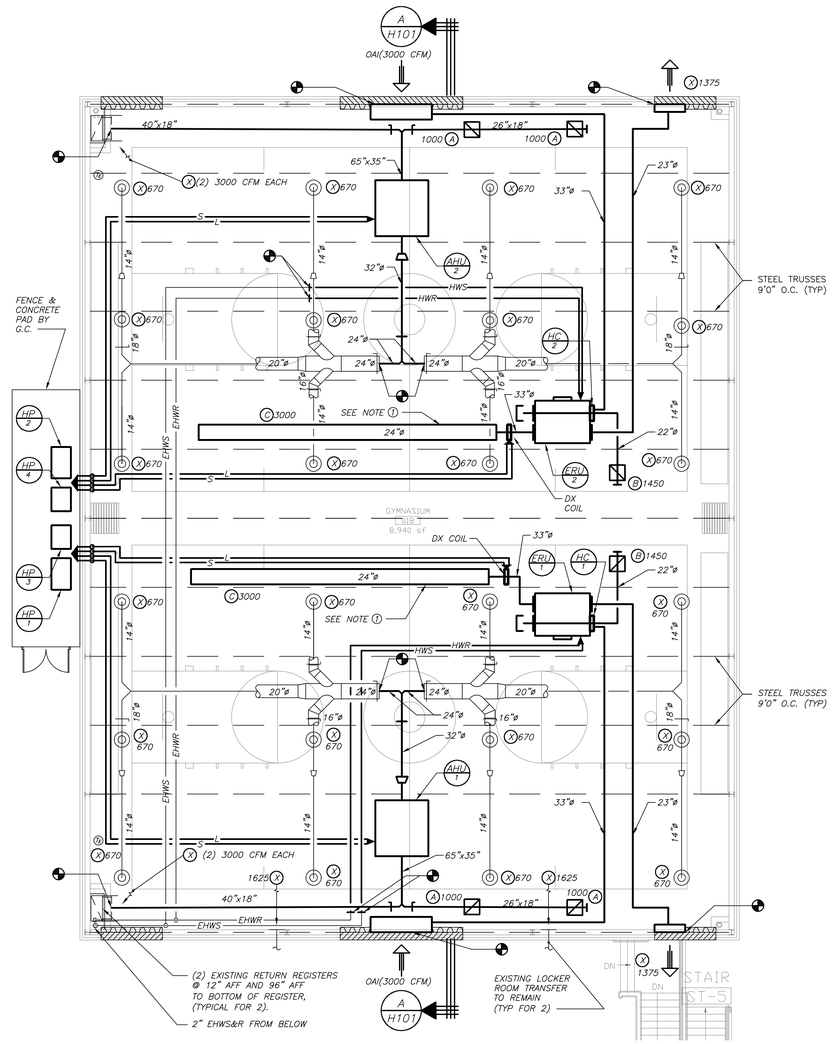
ROBERT E. BELL DETAILS

Job No. 2023-1028	Sheet Number H401-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



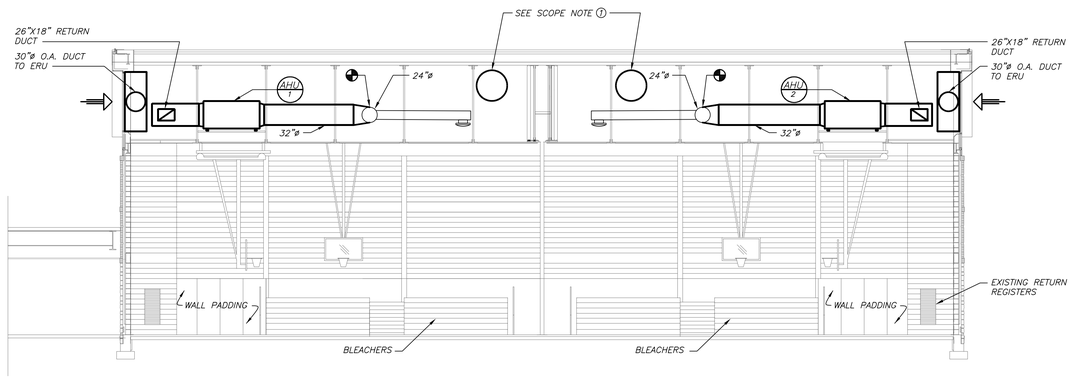
GYM FLOOR PLAN (REMOVALS) — 2 / H101

0 8' 16' — 1/8 inch=1 foot



GYM FLOOR PLAN (NEW WORK) — 1 / H101

0 8' 16' — 1/8 inch=1 foot



GYM SECTION LOOKING WEST — A / H101

0 8' 16' — 1/8 inch=1 foot

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

REMOVAL NOTES:

1. THE SCOPE OF REMOVAL SHOWN ON "REMOVALS" DRAWINGS IS DIAGRAMMATIC ONLY AND INDICATES THE INTENT OF THE WORK TO BE PERFORMED AND NOT THE COMPLETE SCOPE OF DEMOLITION AND/OR REMOVAL WORK. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO REMOVE ANY RELATED MECHANICAL DEVICES EVEN IF NOT SPECIFICALLY INDICATED TO BE REMOVED ON THESE DRAWINGS IN ORDER TO ACCOMMODATE NEW WORK.
2. DEVICES SHOWN CROSS HATCHED ON DRAWINGS ARE ITEMS TO BE REMOVED. ANY DEVICES REMOVED SHALL INCLUDE (BUT SHALL NOT BE LIMITED TO) THE REMOVAL OF ALL ASSOCIATED PIPING, CONTROLS, ETC. THAT ARE NOT INCORPORATED IN THE NEW LAYOUT, UNTIL SUCH REMOVAL IS COMPLETE. THIS CONTRACTOR SHALL PERFORM ALL WORK REQUIRED TO INSURE CONTINUITY OF SERVICE TO EXISTING REMAINING EQUIPMENT. NO EXTRAS RELATING TO THE SCOPE OF WORK DESCRIBED WILL BE ALLOWED.
3. EQUIPMENT, PIPING, ETC., REQUIRED TO RECONNECT SHALL BE INSTALLED CONCEALED WITHIN THE NEW SUSPENDED CEILINGS, PARTITIONS AND/OR WALLS, FLOORS, NO SURFACE MOUNTED OR EXPOSED EQUIPMENT, PIPING, ETC., SHALL BE PERMITTED, UNLESS SPECIFICALLY INDICATED.
4. ALL ITEMS TO BE REMOVED SHALL BE REVIEWED WITH THE OWNER PRIOR TO REMOVAL. OWNER SHALL HAVE FIRST SALVAGE RIGHTS. ITEMS THE OWNER WISHES TO KEEP SHALL BE REMOVED WITH CARE AND STORED AS DIRECTED BY OWNER. ITEMS THE OWNER DOES NOT WISH TO KEEP SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.

SCOPE NOTES

1. PROVIDE NEW UL2518 LISTED FABRIC TYPE CONTINUOUS (24"ø) DISTRIBUTION DUCTWORK MANUFACTURED BY DUCTSOX OR APPROVED EQUAL. DUCTSOX MODEL FTS, WITH LINEAR SUPPLY PORT VENT DESIGN, TUFTEX FABRIC AND SKELECORE TENSIONING SUPPORT SYSTEM FOR ZERO DEFLATION WHEN HVAC SYSTEM IS OFF.

VRF SYSTEM:

THE CONTRACTOR SHALL RETAIN THE SERVICES OF THE MANUFACTURER'S REPRESENTATIVE FOR PURPOSES OF PROVIDING REFRIGERANT PIPING SIZING. CONTRACTOR SHALL PROVIDE PIPING FROM RESPECTIVE OUTDOOR UNIT TO EACH NEW INDOOR UNIT, FOR A COMPLETE AND OPERABLE SYSTEM.

CONDENSATE DRAIN SYSTEM:

THE CONTRACTOR SHALL PROVIDE CONDENSATE PIPING FROM EACH RESPECTIVE INDOOR EVAPORATOR UNIT, COIL, AIR HANDLER, FC, ERU, DOAS, AND RTU TO THE NEAREST FLOOR DRAIN, JANITOR'S SINK, INDIRECT WASTE, OR ROOF DRAIN. FOR A COMPLETER AND OPERABLE SYSTEM. CONDENSATE DRAIN PIPING SHALL BE A MINIMUM 1" ROUND.

HVAC LEGEND

	EXISTING DUCTWORK, EQUIPMENT, ETC. TO REMAIN
	EXISTING DUCTWORK, EQUIPMENT, ETC. TO BE REMOVED
	POINT OF CHANGE IN DUCT SIZE NEW DUCTWORK 1" THERMAL ACOUSTIC LINING–DUCT SIZES ON PLANS ARE CLEAR INSIDE DIMENSIONS
	FLEXIBLE CONNECTION NEW DUCTWORK POINT OF CHANGE IN DUCT SIZE
	SQUARE DUCT TURN WITH TURNING VANES
	EXISTING CEILING DIFFUSER
	EXISTING CEILING REGISTER
	TYPE –SEE SCHEDULE NEW 4–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE NEW 3–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE NEW 2–WAY CEILING DIFFUSER CFM
	TYPE –SEE SCHEDULE CEILING EXHAUST/RETURN REGISTER CFM
	TYPE–SEE SCHEDULE REGISTER/DIFFUSER IDENTIFICATION CFM
	DUCT MTD. MANUAL AIR VOLUME DAMPER (W/LOCKING DEVICE)
	MOTORIZED AIR VOLUME DAMPER (W/ACCESS DOOR)
	FD & AD FIRE DAMPER (U.L. APPROVED) & ACCESS DOOR
	FSD & AD FIRE/SMOKE DAMPER (U.L. APPROVED) & ACCESS DOOR
HWS	HOT WATER HEATING SUPPLY PIPING
HWR / HWRR	HOT WATER RETURN / HOT WATER REVERSE RETURN PIPING
ELPS	EXISTING LOW PRESSURE STEAM PIPING
ECR	EXISTING CONDENSATE RETURN PIPING
L	LIQUID REFRIGERANT PIPING
S	SUCTION REFRIGERANT PIPING
HG	HOT GAS REFRIGERANT PIPING
CD	CONDENSATE DRAIN PIPING
	FLOW DIRECTION WITHIN PIPE CONNECTION TO EQUIPMENT ABOVE
	GATE VALVE (HORIZONTAL/VERTICAL)
	COMBINATION BALANCING & SHUT–OFF VALVE (CIRCUIT SETTER)
	2 – WAY CONTROL VALVE
	CHECK VALVES
	PIPE CONNS. (BOTTOM; TOP 45 OR 90; PIPE UP)
	EXPANSION JOINT, ANCHOR AND GUIDES
ERU-#	ENERGY RECOVERY UNIT IDENTIFICATION
CP-#	CONDENSATE PUMP IDENTIFICATION
DOAS-#	DEDICATED OUTDOOR AIR SYSTEM IDENTIFICATION
FC-#	INDOOR VRF FAN COIL UNIT IDENTIFICATION
RTU-#	ROOFTOP UNIT IDENTIFICATION
CU-#	CONDENSING UNIT IDENTIFICATION
HP-#	OUTDOOR VRF HEAT PUMP UNIT IDENTIFICATION
DXC-#	DIRECT EXPANSION REFRIGERANT COIL IDENTIFICATION
HWC-#	HOT WATER COIL IDENTIFICATION
FS-#	VRF FLOW SELECTOR IDENTIFICATION
AHU-# (EXIST)	EXISTING AIR HANDLING UNIT IDENTIFICATION
ERU-# (EXIST)	EXISTING ENERGY RECOVERY UNIT IDENTIFICATION
CU-# (EXIST)	EXISTING AIR CONDITIONING UNIT IDENTIFICATION
FCU-# (EXIST)	EXISTING FAN COIL UNIT IDENTIFICATION
FC-# (EXIST)	EXISTING INDOOR VRF FAN COIL UNIT IDENTIFICATION
EF-# (EXIST)	EXISTING EXHAUST FAN IDENTIFICATION
CU-# (EXIST)	EXISTING CONDENSING UNIT IDENTIFICATION
MAU-# (EXIST)	EXISTING MAKEUP AIR UNIT IDENTIFICATION
SF-# (EXIST)	EXISTING SUPPLY FAN IDENTIFICATION
RF-# (EXIST)	EXISTING RETURN FAN IDENTIFICATION
EF-# (EXIST)	EXISTING EXHAUST FAN IDENTIFICATION
HX-# (EXIST)	EXISTING HEAT EXCHANGER IDENTIFICATION
HWP-# (EXIST)	EXISTING HOT WATER PUMP IDENTIFICATION
FT-#	NEW FIN TUBE RADIATION IDENTIFICATION NEW ELEMENT LENGTH
FT-# (EXIST)	EXISTING FIN TUBE RADIATION IDENTIFICATION EX
T5	TO CONTROLLED ITEM WALL MTD.(5'–2"±A.F.F–U.O.N.) TEMPERATURE SENSOR
T6	TO CONTROLLED ITEM WALL MTD.(5'–2"±A.F.F–U.O.N.) REVERSE ACTING THERMOSTAT
T	EXISTING WALL MTD. TEMPERATURE SENSOR
CO2	WALL MTD. CARBON DIOXIDE SENSOR
–U–	DOOR UNDERCUT
CD	CEILING DIFFUSER
CR	CEILING REGISTER
TR	TOP WALL REGISTER
CFM	CUBIC FEET PER MINUTE
CV	MOTORIZED CONTROL VALVE
PFRE	PRE–FINISHED RISER ENCLOSURE
AFF	ABOVE FINISHED FLOOR
OAI/FAI	OUTSIDE (FRESH) AIR INTAKE
HVAC	HEATING, VENTILATING, AIR CONDITIONING CONTRACTOR
FC	FLEXIBLE CONNECTION
FSC	FULL SIZE CONNECTION
FSD/AD	FIRE/SMOKE DAMPER / ACCESS DOOR
AD	ACCESS DOOR
FD	FIRE DAMPER
TD	TRANSFER DUCT
MD	MOTORIZED DAMPER
WMG	WIRE MESH GRILLE
VIF	VERIFY IN FIELD
	SECTION/DETAIL/ELEVATION/PART PLAN NUMBER DRAWING NUMBER SECTION/ELEVATION IDENTIFICATION

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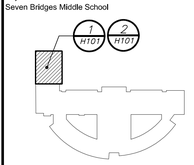
Key Plan
Seven Bridges Middle School



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No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

SEVEN BRIDGES LEGEND, NOTES AND GYM FLOOR PLANS

Job No. 2023-1028	Sheet Number H101-SB
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

DBE: TAB: H101 – Y:\CHAPPAQUA CSD\Chappaqua CSD – DW Capital Projects (2332.00)\Drawings\HVAC\SEVEN BRIDGES MS\233200–H101–SBMS.dwg – DATE: Sep 01, 2023 – 3:25pm

SCHEDULE OF AIR HANDLING UNITS

MARK	MODEL No. (1)	CFM	MIN. O.A. CFM	HEATING DATA		COOLING DATA (2)		FILTER TYPE	MOTOR H.P.	ELECTRICAL DATA			PHYSICAL DATA DIMENSION / WEIGHT	REMARKS
				CAPACITY MBH	ROWS	CAPACITY MBH	ROWS			MCA	MOP	ELECTRICAL SERVICE		
AHU 1	AVS085-R-FCV	8000	–	240	0	240	3	MERV 8/2"	5.0	8.4	15.1	460/3/60	98"Lx22"Dx30"H/675LBS	REFER TO (3)(4)
AHU 2	AVS085-R-FCV	8000	–	240	0	240	3	MERV 8/2"	5.0	8.4	15.1	460/3/60	98"Lx22"Dx30"H/675LBS	REFER TO (3)(4)

NOTES
1. AS MANUFACTURED BY "VENTUS".
2. BASED ON A.R.I. CERTIFIED COIL SELECTIONS; REFRIGERANT R-410A.
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
4. PROVIDE GAS REHEAT.

SCHEDULE OF ENERGY RECOVERY UNITS

GENERAL DATA				SUPPLY FAN DATA			RETURN-EXH. FAN DATA			ELECTRICAL DATA			HEAT EXCHANGER		HOT WATER HEATING COIL DATA	FILTER	PHYSICAL DATA	REMARKS
MARK	SERVICE	LOCATION	MODEL No. (1)	CFM	MOTOR W	E.S.P. IN WG.	CFM	MOTOR HP	E.S.P. IN WG.	MCA	MOP	ELECTRICAL SERVICE	MODEL	THERMAL EFFICIENCY (%)		TYPE	LxHxW(in.)/WEIGHT(lbs)	
ERU 1	GYM	ROOF	TOPVEX FR 3800	3000	6200	1.0	3000	6200	1.0	17.5	25	208/3/60	–	–	HWC 1 REFER TO SCHEDULE OF HOT WATER COILS	MERV 13 & MERV 9	96.5x33.1x60/948	REFER TO (2)(3)
ERU 2	GYM	ROOF	TOPVEX FR 3800	3000	6200	1.0	3000	6200	1.0	17.5	25	208/3/60	–	–	HWC 2 REFER TO SCHEDULE OF HOT WATER COILS	MERV 13 & MERV 9	96.5x33.1x60/948	REFER TO (2)(3)

NOTES
1. AS MANUFACTURED BY "SYSTEMAIR".
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. BASED ON ENTERING/LEAVING WATER TEMPERATURES HW 180/160".

SCHEDULE OF VRF DUCTLESS AIR SOURCE HEAT RECOVERY OUTDOOR UNITS

GENERAL DATA				CAPACITY		PHYSICAL DATA		ELECTRICAL INFORMATION			EER	COP	REMARKS
MARK	SERVICE	LOCATION	MODEL No. (1)	COOLING CAPACITY BTU/HR	HEATING CAPACITY BTU/HR	DxWxH (IN)	WEIGHT (LBS)	V/PH/HZ	MCA	MOCP			
HP 1	GYM AHU	OUTDOORS	MULTI V5 ARUM241 DTE5	233,100	243,000	30x49x67	666	460/3/60	41.4	50	10.40	2.26	REFER TO (2)(3)(4)(5)(6)(7)
HP 2	GYM AHU	OUTDOORS	MULTI V5 ARUM241 DTE5	233,100	243,000	30x49x67	666	460/3/60	41.4	50	10.40	2.26	REFER TO (2)(3)(4)(5)(6)(7)
HP 3	GYM DX COIL	OUTDOORS	MULTI V5 ARUM072 DTE5	72,000	81,000	30x37x67	430	460/3/60	12.8	20	13.0	2.49	REFER TO (2)(3)(4)(5)(6)(7)
HP 4	GYM DX COIL	OUTDOORS	MULTI V5 ARUM072 DTE5	72,000	81,000	30x37x67	430	460/3/60	12.8	20	13.0	2.49	REFER TO (2)(3)(4)(5)(6)(7)

NOTES
1. AS MANUFACTURED BY "LG.".
2. BASED ON A.R.I. CERTIFIED COIL SELECTIONS; REFRIGERANT R-410A.
3. INSTALL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE DC INVERTER COMPRESSOR SPEED CONTROL BASED ON SYSTEM LOAD.
5. PROVIDE PROGRAMMABLE THERMOSTAT, LOW AMBIENT CONTROL, HARD START, CRANKCASE HEATER, DISCONNECT SWITCH. THE VRF SYSTEM SHALL BE ABLE TO INTEGRATE WITH THE BUILDING MANAGEMENT SYSTEM VIA BACNET IP GATEWAY. THIS GATEWAY CONVERTS BETWEEN BACNET IP OR MODBUS TCP PROTOCOL AND RS-485 LOAP (LG AIRCON PROTOCOL) ALLOWING THIRD PARTY CONTROL AND MONITORING OF THE LG A/C SYSTEM, OR LONWORKS GATEWAYS.
6. FURNISH RAILS FOR GC INSTALLATION.
7. INDICATED EQUIPMENT DESIGNATIONS ARE FOR USE IN CONSTRUCTION ONLY. CONTRACTOR SHALL COORDINATE WITH OWNER ON DESIRED FINAL TAG IDENTIFICATION/NUMBERING/LETTERING. OWNER APPROVED DESIGNATIONS SHALL BE USED IN BMS PROGRAMMING AND ON PERMANENT EQUIPMENT IDENTIFICATION TAGS. AS-BUILT DRAWINGS SHALL BE UPDATED WITH FINAL IDENTIFICATION TAG DESIGNATIONS.

SCHEDULE OF REGISTERS AND DIFFUSERS

MARK	TYPE	SERVICE	MODEL No. (1)	DIRECTION DISCHARGE	DAMPER TYPE	FINISH	REMARKS
A	CEILING DIFFUSER	RETURN	–	–	OPPOSED BLADE	PER ARCH.	REFER TO (2)(3)(6)
B	CEILING DIFFUSER	RETURN	–	–	↓	↓	REFER TO (2)(4)(5)
C	DUCT SOX	SUPPLY	–	–	–	–	REFER TO (2)

NOTES
1. AS MANUFACTURED BY "?".
2. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
3. BARS SET @ 0 DEGREES DEFLECTION.
4. PROVIDE MODEL KXEA EQUALIZING GRID.

(5) SUPPLY NECK SIZE PER CFM RANGE (NOT TO EXCEED 500 fpm)

50 TO 99	100 TO 299	300 TO 499	500 TO 799	800 TO 1199	1200 TO 1499	1500 TO 1999
6x6	9x9	12x12	15x15	18x18	21X21	24X24

(6) RETURN NECK SIZE PER CFM RANGE (NOT TO EXCEED 675 fpm)

50 TO 149	150 TO 249	250 TO 399	400 TO 599	600 TO 799	800 TO 1099	1100 TO 1199	1200 TO 2399
6x6	8X8	10X10	12X12	14X14	16X16	18X18	24X24

SCHEDULE OF HOT WATER HEATING COILS

MARK	SERVICE	HTG. CAPACITY BTU/HR	E.A.T. (°F)	L.A.T. (°F)	E.W.T. (°F)	L.W.T. (°F)	GPM	CFM	COIL FACE AREA SQ.FT.	COIL FACE VELOC.FPM	ROWS	REMARKS
HWC 1	ERU 1	89,500	–	–	–	–	–	3,000	–	–	–	REFER TO (1)(2)
HWC 2	ERU 2	89,500	–	–	–	–	–	3,000	–	–	–	REFER TO (1)(2)

NOTES
1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
2. BASED ON ENTERING/LEAVING WATER TEMPERATURES HW 180/160".

SCHEDULE OF MINIMUM VENTILATION ROOM FLOW RATES

		A	B	C	D	E	F	G	H	I	
ROOM NAME/NUMBER	OCCUPANCY CATEGORY	ROOM AREA (SQ.FT.)	PEOPLE DENSITY (#P/1000 SQ.FT.)	PEOPLE OUTDOOR AIR FLOW RATE (CFM/PERSON)	AREA OUTDOOR AIR FLOW RATE IN BREATHING ZONE (CFM/SQ.FT.)	EXHAUST AIR FLOW RATE (CFM/SQ.FT.)	NUMBER OF PEOPLE (A×B)÷1000=#P	OUTDOOR AIR FLOW RATE WITHOUT ZONE EFFECTIVENESS FACTOR (F×C)+(A×D)=CFM	ZONE AIR DISTRIBUTION EFFECTIVENESS FACTOR	MINIMUM ROOM VENTILATION AIR FLOW RATE G÷H=CFM	MINIMUM EXHAUST AIR FLOW RATE A×E=CFM
GYMNASIUM	GYM, SPORTS ARENA (PLAY AREA)	8940	7	20	0.18	0.5	63	2869	0.8	3587	4470

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DBE: TAB: H301 – Y:\CHAPPAQUA CSD\Chappaqua CSD – DW Capital Projects (2332.00)\Drawings\HVAC\SEVEN BRIDGES MS\233200-H301-SBMS.dwg – DATE: Sep 01, 2023 – 3:25pm

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BE: 66-10-04-06-0-009-025
SB: 66-10-04-06-0-036-007

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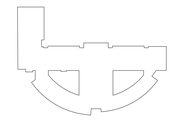
Key Plan
Seven Bridges Middle School



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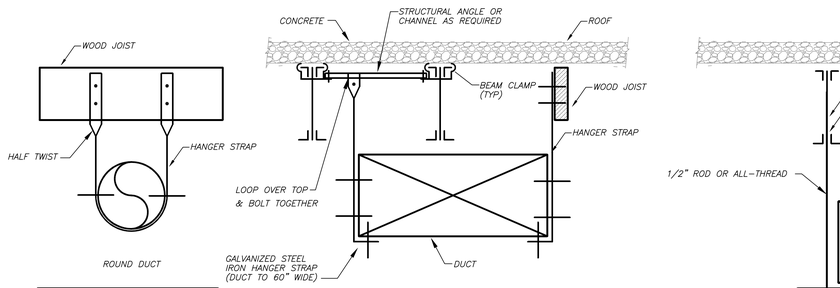
No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

SEVEN BRIDGES SCHEDULES

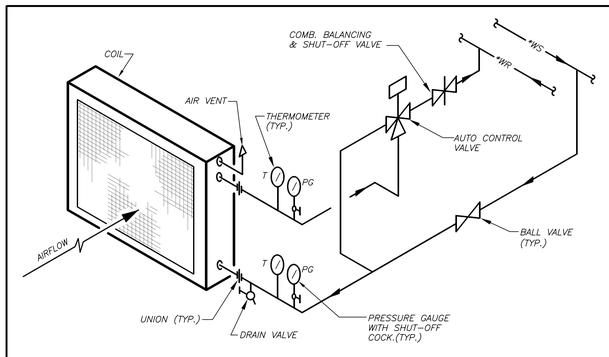
Job No. 2023-1028	Sheet Number H301-SB
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



HANGER STRAP TABLE	
DUCT SIZE	METAL GAUGE
UPTO 2 SQFT.	20 GA. GALV.
UPTO 4 SQFT.	16 GA. GALV.
UPTO 6 SQFT	12 GA. GALV.
UPTO 8 SQFT.	1/16" GALV.
OVER 8 SQFT.	SEE SMACNA GUIDELINE

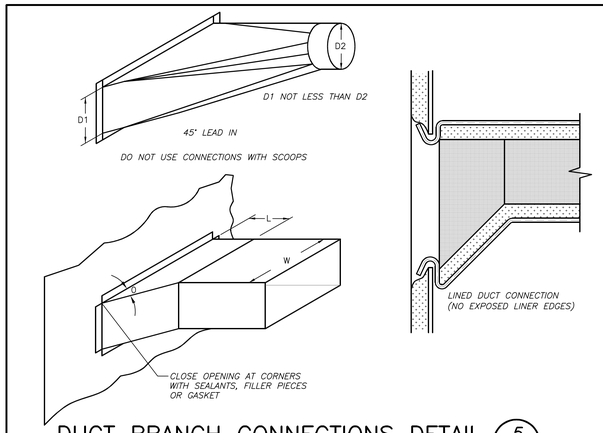
DUCT SUPPORT DETAIL

1 / H401 — NO SCALE



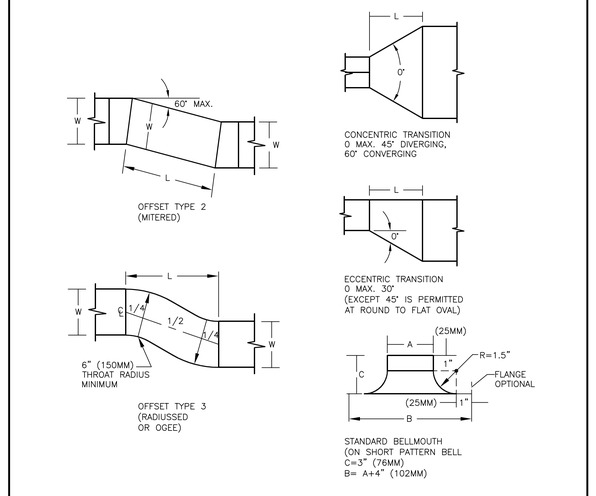
COIL PIPING CONNECTION DETAIL

9 / H401 — NO SCALE



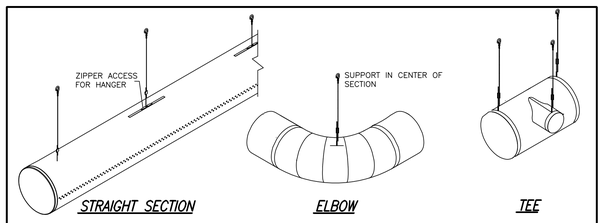
DUCT BRANCH CONNECTIONS DETAIL

5 / H401 — NO SCALE



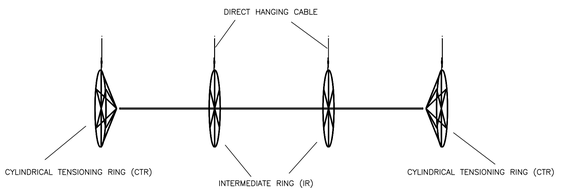
DUCT OFFSETS AND TRANSITIONS DETAIL

2 / H401 — NO SCALE



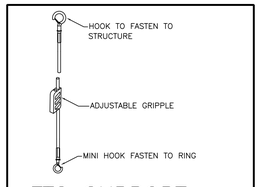
FTS FITTING SUSPENSION DETAIL

6 / H401 — NO SCALE



SKELECOR FTS SUSPENSION DETAIL

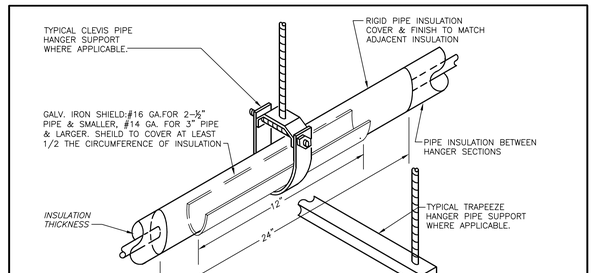
7 / H401 — NO SCALE



FTS SUPPORT DETAIL

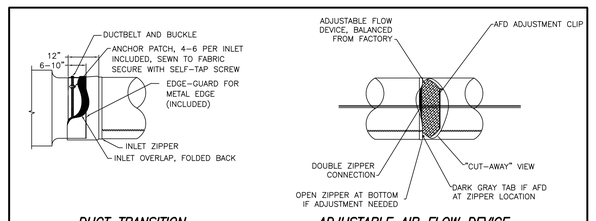
NO SCALE

8 / H401



INSULATED PIPE HANGER DETAIL

3 / H401 — NO SCALE



FTS CONNECTION/FLOW CONTROL DETAIL

NO SCALE

4 / H101

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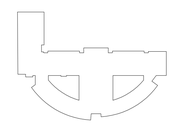

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SEVEN BRIDGES DETAILS

Job No. 2023-1028	Sheet Number H401-SB
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS AND THE BEST PRACTICES OF THE TRADE FOR FIRST CLASS ELECTRICAL INSTALLATION.

2. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND ELEVATION OF ALL ELECTRICAL EQUIPMENT SHALL BE COORDINATED IN FIELD WITH RESPECTIVE CONTRACTOR/OWNER.

3. WHERE PANELBOARDS, SWITCHES, CIRCUIT BREAKERS, ETC. ARE EXISTING AND TO BE REUSED THE CONTRACTOR SHALL CLEAN AND REFURBISH THE EQUIPMENT. THIS SHALL INCLUDE TIGHTENING ALL CONNECTIONS, REPLACING DEFECTIVE MECHANISMS AND PROVIDING ALL REQUIRED AND NECESSARY MISCELLANEOUS COMPONENTS SO THAT THE EQUIPMENT SHALL BE IN PERFECT WORKING ORDER.

4. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO SUBMISSION OF BID TO DETERMINE WHAT WORK MUST BE PERFORMED AFTER NORMAL BUSINESS HOURS. UNLESS OTHERWISE DIRECTED ANY NOISY WORK (CHOPPING, CORE DRILLING, HAMMERING, ETC.) AND BUILDING POWER INTERRUPTIONS SHALL BE PERFORMED OUTSIDE OF NORMAL BUSINESS HOURS. CONFIRM NORMAL BUSINESS HOURS WITH BUILDING OWNER. NO ADDITIONAL COST WILL BE CHARGED TO OWNER FOR WORK PERFORMED OUTSIDE NORMAL BUSINESS HOURS.

5. ALL WORK WHERE SHOWN WITH DARK/SOLID LINES ON THE DRAWINGS IS NEW UNLESS OTHERWISE NOTED. WHERE SHOWN WITH DASHED LINES WITH LETTER (E) IS EXISTING TO REMAIN, WITH LETTER (R) IS EXISTING TO BE REMOVED.

6. FEEDERS AND BRANCH CIRCUITRY SHALL BE RUN IN MINIMUM $^{3}/_{4}$" CONDUIT UNLESS OTHERWISE NOTED. FINAL CONNECTIONS TO MOTORS MAY BE MADE WITH FLEXIBLE METALLIC CONDUIT (NO LONGER THAN 18"). IN UNFINISHED AREAS CONDUIT SHALL BE RUN EXPOSED AND IN FINISHED AREAS CONDUIT SHALL BE RUN CONCEALED.

7. PROVIDE PANEL NAME PLATE MADE OF BLACK LAMINATED PLASTIC WITH WHITE ENGRAVED LETTERING AND TYPE WRITTEN DIRECTORY FOR ALL NEW AND EXISTING PANELS BEING USED FOR THIS PROJECT.

8. ALL CONDUCTORS SHALL BE COPPER, TYPE THHN/THWN INSULATED. ALL CONDUCTORS SHALL HAVE 600 VOLT RATED INSULATION UNLESS OTHERWISE NOTED.

9. THE USE OF FLEXIBLE CONDUIT FROM LIGHTING FIXTURES TO JUNCTION BOX IS PERMITTED ONLY WHEN A SEPARATE GROUND WIRE IS INSTALLED WITH THE CONDUCTORS INSIDE FLEXIBLE CONDUIT. THE GROUND WIRE MUST BOND THE FIXTURE HOUSING TO THE JUNCTION BOX. MAXIMUM LENGTH 6'-0".

10. EXACT LOCATION AND MOUNTING HEIGHTS OF ALL DEVICES SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO THE INSTALLATION.

11. WALL MOUNTED EQUIPMENT (SWITCHES, RECEPTACLES, ETC..) SHALL BE SURFACE MOUNTED IN UNFINISHED AREAS AND ON EXISTING CONCRETE BLOCK WALLS AND FLUSH MOUNTED IN NEW WALLS/PARTITIONS.

12. CONDUIT RUNS SHALL BE PARALLEL WITH OR AT RIGHT ANGLES TO WALLS AND CEILINGS. CONDUIT SHALL BE SUPPORTED BY APPROVED MEANS. SUPPORTS FOR HORIZONTAL RUNS OF CONDUIT SHALL NOT EXCEED SEVEN FEET ON CENTERS.

13. PROVIDE PULL BOXES, JUNCTION BOXES, CONDUIT ELBOWS AND OFFSETS TO SUIT FIELD CONDITIONS AND THE NATIONAL ELECTRICAL CODE.

14. ALL EMPTY CONDUIT SHALL BE PROVIDED WITH A DRAGWIRE.

15. THE MINIMUM WIRE SIZE FOR 120 VOLT BRANCH CIRCUITS SHALL BE NO. 12 AWG, EXCEPT OVER 100' IN LENGTH SHALL BE NO. 10 AWG.

16. PROVIDE ALL REQUIRED AND NECESSARY ACCESSORIES (EX. CONNECTORS, ADAPTERS, BUSHINGS, CLAMPS, ETC.) TO FACILITATE COMPLETE INSTALLATION.

17. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT WITH HVAC CONTRACTOR IN FIELD. FUSES FOR ALL MOTOR LOADS SHALL BE DUAL ELEMENT TIME DELAY TYPE.

18. ALL JUNCTION OR OUTLET BOXES SHALL BE INSTALLED SO AS TO ALLOW ACCESS TO COVER. PROVIDE ARCHITECT APPROVED ACCESS DOORS OR PLATES AS REQUIRED IN AREAS WHERE UNOBSTRUCTED ACCESS TO BOX OR OUTLET IS NOT POSSIBLE.

19. PRIOR TO ANY CHASING, CHOPPING OR CORE DRILLING BEING PERFORMED, THE CONTRACTOR SHALL FIELD INVESTIGATE CONDITIONS AND COORDINATE ALL WORK TO ENSURE THAT IT WILL BE IN HARMONY AND NOT AFFECT ANY EXISTING BUILDING SYSTEMS. THIS WORK MUST BE APPROVED BY BUILDING OWNER PRIOR TO PROCEEDING.

20. OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE RESISTANCE RATED WALLS, PARTITIONS, FLOORS OR CEILINGS SHALL BE FIRE STOPPED USING APPROVED METHODS. ALL SLEEVES MUST HAVE BUSHINGS. SEALANT SHALL BE 3 HOUR FIRE BARRIER #CP-25 (NO LESS THAN 3" THICK BACKED UP WITH MINERAL WOOL).

21. ALL PANELBOARD COVERS SHALL BE INSTALLED IN PLACE AT THE COMPLETION OF EACH DAYS WORK.

22. PREPARE "AS-BUILT" DRAWINGS THAT REFLECT ACTUAL CONSTRUCTION AND SHOW DEVIATIONS FROM DESIGN DRAWINGS.

23. ALL NEW CIRCUIT BREAKERS INSTALLED INTO EXISTING PANELBOARDS SHALL BE UL LISTED FOR USE IN THE PANEL.

GENERAL REMOVAL NOTES

1. BEFORE COMMENCING WORK, EXAMINE ALL ADJOINING AREAS THAT MAY BE AFFECTED BY REMOVAL. REPORT TO THE GENERAL CONTRACTOR ANY CONDITION THAT PREVENTS PERFORMANCE OF THE WORK.

2. BECOME THOROUGHLY FAMILIAR WITH EXISTING CONDITIONS WHERE CONNECTIONS MUST BE MADE, CHANGED OR ALTERED. THE INTENT OF THE WORK IS SHOWN ON THE DRAWINGS AND DESCRIBED HEREINAFTER AND NO CONSIDERATION WILL BE GRANTED BY REASON OF LACK OF FAMILIARITY ON THE PART OF THE CONTRACTOR WITH ACTUAL PHYSICAL CONDITIONS AT THE SITE. INSPECT EACH AND EVERY AREA AFFECTED BY THE ALTERATION OF THE SPACE BEFORE SUBMITTAL OF BID.

3. ALL ELECTRICAL EQUIPMENT IN THE AREA OF WORK IS EXISTING TO BE REMOVED UNLESS OTHERWISE NOTED. THIS SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   A. DISTRIBUTION BOARDS AND PANELBOARDS.
   B. CIRCUIT BREAKERS AND DISCONNECT SWITCHES.

4. ALL CONDUCTORS AND CONDUIT ASSOCIATED WITH REMOVED ELECTRICAL EQUIPMENT SHALL BE REMOVED COMPLETELY BACK TO ITS SOURCE OF POWER AND DISCONNECTED.

5. ALL POWER CONDUCTORS, CONTROL WIRING AND CONDUIT ASSOCIATED WITH MECHANICAL EQUIPMENT SUCH AS FANS, AIR CONDITIONING UNITS, PUMPS, ETC. DESIGNATED FOR REMOVAL ON THE HVAC AND PLUMBING REMOVAL DRAWINGS SHALL BE REMOVED CLEAR BACK TO THE SOURCE OF POWER AND DISCONNECTED. ALL MOTOR STARTERS, DISCONNECT SWITCHES, CONTROL DEVICES, ETC. SHALL BE REMOVED. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.

6. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO TRACE AND RELOCATE ALL EXISTING FEEDERS AND BRANCH CIRCUIT WIRING WHICH PASSES THROUGH THE REMOVAL AREA THAT SERVE EXISTING OCCUPIED SPACES TO REMAIN. COORDINATE WITH BUILDING MANAGER PRIOR TO ANY SHUTDOWNS OR DISRUPTIONS THAT MAY BE REQUIRED TO ACCOMPLISH THIS WORK.

7. DISPOSE OF ALL REMOVED EQUIPMENT, WHICH IS NOT INTENDED TO BE REUSED. PRIOR TO DISPOSAL, CONTACT BUILDING MANAGER TO DETERMINE IF ANY REMOVED EQUIPMENT IS DESIRED FOR STOCK.

8. EXISTING CIRCUIT BREAKERS IN PANEL(S) ARE TO BE RE-USED. ELECTRICAL CONTRACTOR TO DISCONNECT PANEL AND CIRCUIT BREAKERS WITH GREAT CARE TO ENSURE AGAINST DAMAGE. THIS CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS AS REQUIRED. ALL NEW CIRCUIT BREAKERS INSTALLED INTO EXISTING PANELBOARDS SHALL BE UL LISTED FOR USE IN THE PANEL.

9. EXISTING EQUIPMENT DESIGNATED FOR REUSE SHALL BE CLEANED, REFURBISHED AND RESTORED TO OPTIMUM PERFORMANCE. THIS SHALL INCLUDE BUT NOT LIMITED TO CLEANING OF LIGHT FIXTURES, REPLACEMENT OF INOPERABLE BALLASTS AND LAMPS, RESISTANCE TESTING OF BRANCH CIRCUITRY AND FEEDERS, ETC.

10. EXTEND EXISTING CIRCUITRY TO THOSE DEVICES THAT ARE TO BE RELOCATED. MATCH EXISTING TYPE AND SIZE. RELOCATION OF EXISTING EQUIPMENT SHALL BE PERFORMED ONLY UPON OWNERS ACCEPTANCE OF EXISTING EQUIPMENT.

11. EXTEND EXISTING CIRCUITS SERVING EQUIPMENT TO REMAIN FROM PANELS THAT ARE TO BE REMOVED TO NEW PANELS OR EXISTING PANELS THAT ARE TO REMAIN.

ABBREVIATIONS

ABBV.	DESCRIPTION
A	AMP/AMPERE
C.B.	CIRCUIT BREAKER
CKT	CIRCUIT
(E)	EXISTING TO REMAIN
E.C.	ELECTRICAL CONTRACTOR
EXIST.	EXISTING
FA	FIRE ALARM
F.A.C.P.	FIRE ALARM CONTROL PANEL
F.B.O	FURNISHED BY OTHERS
G,GRD	GROUND
HVAC	HEATING, VENTILATING AND AIR-CONDITIONING UNIT
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MTD	MOUNTED
NTS	NOT TO SCALE
(N)	EXISTING TO REMAIN
PNL	PANEL
(R)	REMOVE EXISTING
WP	WEATHERPROOF

LEGEND

A	2'x4' LED CEILING MOUNTED LIGHT FIXTURE. UPPER CASE LETTER DENOTES TYPE, LOWER CASE LETTER DENOTES SWITCH CONTROL. FIXTURE SCHEDULE DENOTES TYPE.
EM	2'x4' LED CEILING MOUNTED LIGHT FIXTURE FOR EMERGENCY OPERATION. "EM" INDICATES SWITCHED EMERGENCY FIXTURE, "EM/NL"-UNSWITCHED EMERGENCY/NIGHT FIXTURE (TYP.).
	CEILING/WALL MOUNTED EXIT LIGHT WITH OUTLET BOX, DIRECTIONAL ARROWS SHADED PORTION INDICATES ILLUMINATED FACE. SCHEDULE DENOTES TYPE.
	WALL MOUNTED EMERGENCY LIGHT FIXTURE WITH INTEGRAL BATTERY BACK-UP.
3	HOMERUN TO DESIGNATED PANEL, ARROWHEAD INDICATES SINGLE POLE CIRCUIT. HOMERUN SHALL CONSIST OF 2#12-3/4"C U.O.N.
2,(4,6)	HOMERUN TO DESIGNATED PANEL, NUMBERS IN PARENTHESIS INDICATE MULTIPLE CIRCUIT, I.E. 3-HOTS AND 1-GROUND U.O.N.
	EXISTING TO REMAIN
	EXISTING TO BE REMOVED
	NEW
	SURFACE MOUNTED NEW ELECTRICAL PANELBOARD.
S	CEILING MOUNTED IONIZATION TYPE SMOKE DETECTOR
F	WALL MOUNTED COMBINATION FIRE ALARM HORN/STROBE DEVICE.
B	SCHOOL BELL.
F	WALL MOUNTED FIRE ALARM MANUAL PULL STATION
A	AMBER ALERT
WAP	WIRELESS ACCESS POINT
SD	DUCT MOUNTED IONIZATION TYPE SMOKE DETECTOR WITH REMOTE MOUNTED L.E.D. AND TEST BUTTON. MOUNT L.E.D. & TEST BUTTON UNDER SINGLE COVER PLATE ON CEILING. (TYP. U.O.N.).
FACP	FIRE ALARM CONTROL PANEL.
240/3 60 40 WP	HEAVY DUTY TYPE DISCONNECT SWITCH WITH FINAL FLEXIBLE EQUIPMENT CONNECTION. 240 INDICATES VOLTAGE, 3 INDICATES NO. OF POLES, 60 INDICATES AMPERE RATING, NF INDICATES NON-FUSED(OR FUSE SIZE) U.O.N. REFER TO SPECIFICATION AND DRAWINGS FOR ENCLOSURE. "WP" WHERE USED INDICATES WEATHERPROOF ENCLOSURE (NEMA 3R).
S_T	THERMAL SWITCH, CUTLER-HAMMER MS SERIES MANUAL STARTERS SINGLE-PHASE 20AMP, 120V U.O.N. WHERE INDICATED WITH "WP" PROVIDE WATERTIGHT ENCLOSURE TYPE 3.
S_{2T}	208 VOLT, SINGLE PHASE 2 POLE, THERMAL OVERLOAD PROTECTED TOGGLE TYPE SWITCH. SIMILAR TO EATON #AH4361 + #AH27940G NEMA 1 ENCLOSURE.
(5)	MOTOR (F.B.O. WIRED BY ELEC.) - NUMBER INDICATES HORSEPOWER. REFER TO PANEL SCHEDULES FOR WIRING AND OVER CURRENT PROTECTION.
1	TAG SYMBOL. NUMERAL DENOTES REFERENCE TO A WORK NOTE.
	MECHANICAL EQUIPMENT IDENTIFICATION: EQUIPMENT ABBREVIATION (FE, SF, HV, ETC. SEE ABBREVIATIONS ON THIS DWG.) / EQUIPMENT NUMBER
	DETAIL/PART PLAN NUMBER IDENTIFICATION: DETAIL/PART PLAN NUMBER / DRAWING NUMBER

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DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

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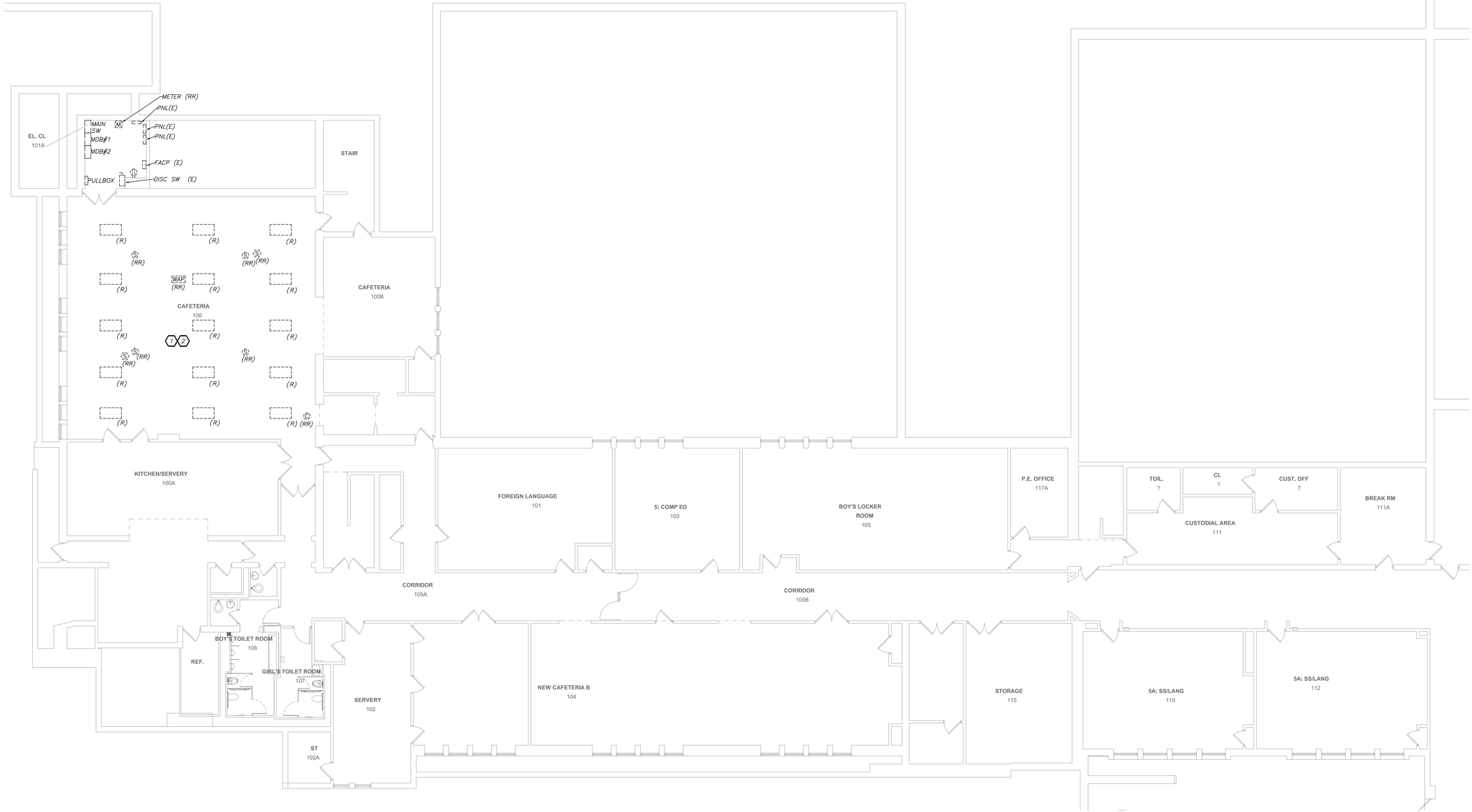
Sheet Title

LEGEND, ABBREVIATIONS & NOTES

Job No. 2023-1028	Sheet Number E001
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



FIRST FLOOR PART PLAN (REMOVALS & REINSTALLTIONS)

1 / E101

0 8' 16'

1/8 inch=1 foot

REMOVAL NOTES:

(1) IN THIS AREA OF WORK, REMOVE EXISTING LIGHTING AND COIL UP THE BRANCH CIRCUIT TO USE AFTER NEW CEILING IS INSTALLED. OTHER CEILING MOUNTED DEVICES SUCH AS SMOKE DETECTORS, PA SPEAKERS ETC., SHALL BE REMOVED, STORED AND REINSTALLED BY ELECTRICAL CONTRACTOR AFTER THE NEW CEILING IS INSTALLED. ALL ASSOCIATED ABOVE CEILING JUNCTION BOXES SHALL BE RELOCATED TO ACCOMMODATE NEW MECHANICAL EQUIPMENT DUCTWORK AND PIPING. COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTOR FOR THE EXACT LOCATION OF EXISTING JUNCTION BOXES. ALL WALL MOUNTED DEVICES LOCATED WITHIN 1FT OF THE CEILING SUCH AS AMBER ALERT, SCHOOL BELL, EMERGENCY BATTERY PACK LIGHTS SHALL BE REMOVED AND REINSTALLED BELOW NEW CEILING. EXTEND EXISTING WIRING/BRANCH CIRCUITRY AND PROVIDE ALL REQUIRED AND NECESSARY JUNCTION BOXES.

(2) EXISTING CEILING MOUNTED CAMERAS AND WAP'S SHALL BE REMOVED, STORED AND REINSTALLED INTO NEW CEILING BY OWNERS VENDOR.

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

KG+D listen imagine build

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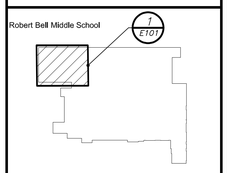

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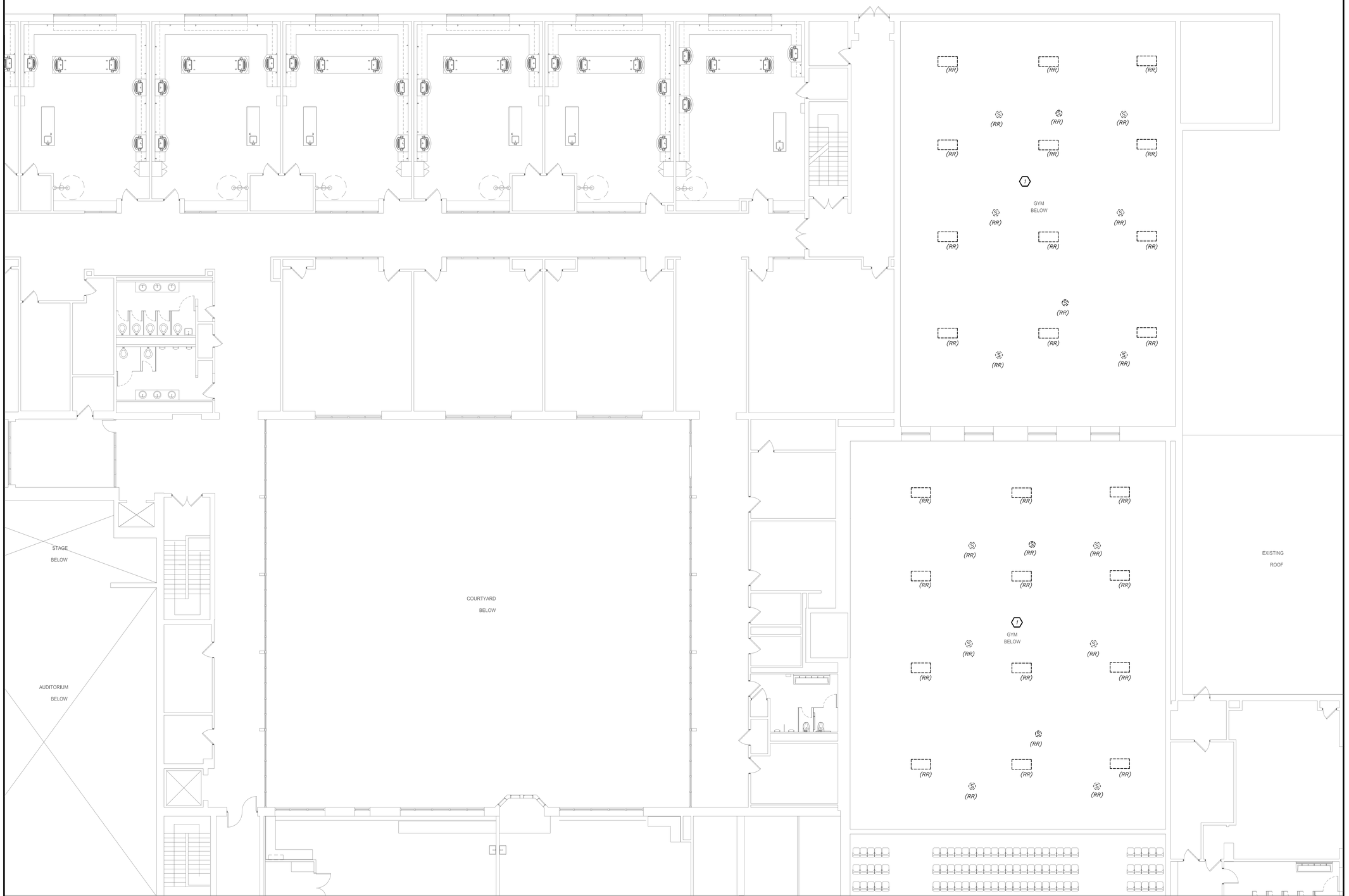
No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL FIRST FLOOR PART REMOVAL PLAN

Job No. 2023-1028	Sheet Number E101-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



THIRD FLOOR PART PLAN (REMOVALS & REINSTALLTIONS)

1 / E102

0 8' 16'

1/8 inch=1 foot

REMOVAL NOTES:

1. *IN THIS AREA OF WORK, REMOVE EXISTING LIGHTING AND COIL UP THE BRANCH CIRCUIT TO USE AFTER NEW CEILING IS INSTALLED. OTHER CEILING MOUNTED DEVICES SUCH AS SMOKE DETECTORS, PA SPEAKERS ETC., SHALL BE REMOVED, STORED AND REINSTALLED BY ELECTRICAL CONTRACTOR AFTER THE NEW CEILING IS INSTALLED. ALL ASSOCIATED ABOVE CEILING JUNCTION BOXES SHALL BE RELOCATED TO ACCOMMODATE NEW MECHANICAL EQUIPMENT DUCTWORK AND PIPING. COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTOR FOR THE EXACT LOCATION OF EXISTING JUNCTION BOXES. ALL WALL MOUNTED DEVICES LOCATED WITHIN 1FT OF THE CEILING SUCH AS AMBER ALERT, SCHOOL BELL, EMERGENCY BATTERY PACK LIGHTS SHALL BE REMOVED AND REINSTALLED BELOW NEW CEILING. EXTEND EXISTING WIRING/BRANCH CIRCUITRY AND PROVIDE ALL REQUIRED AND NECESSARY JUNCTION BOXES.*
2. *EXISTING CEILING MOUNTED CAMERAS AND WAP'S SHALL BE REMOVED, STORED AND REINSTALLED INTO NEW CEILING BY OWNERS VENDOR.*

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
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Chappaqua, NY 10514

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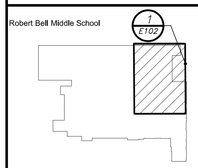

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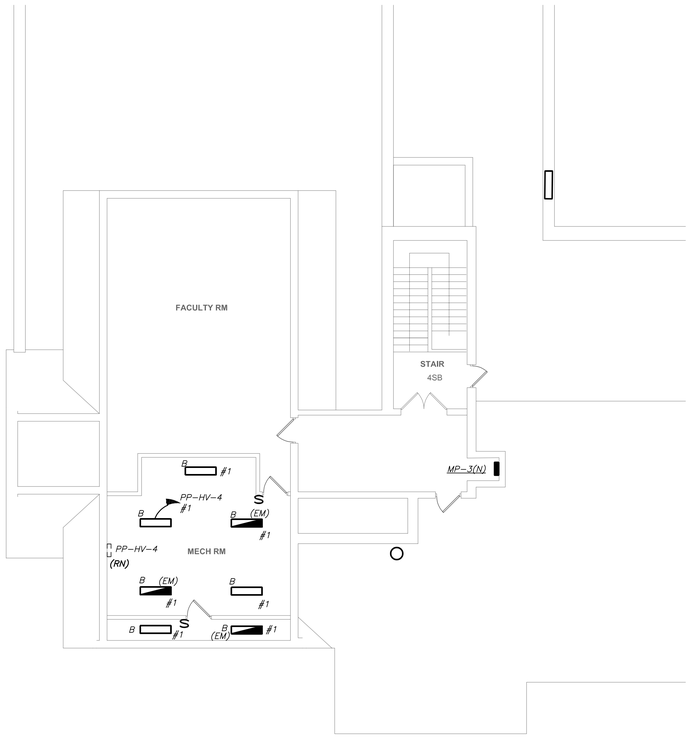
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL THIRD FLOOR PART REMOVAL PLAN

Job No. 2023-1028	Sheet Number E102-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

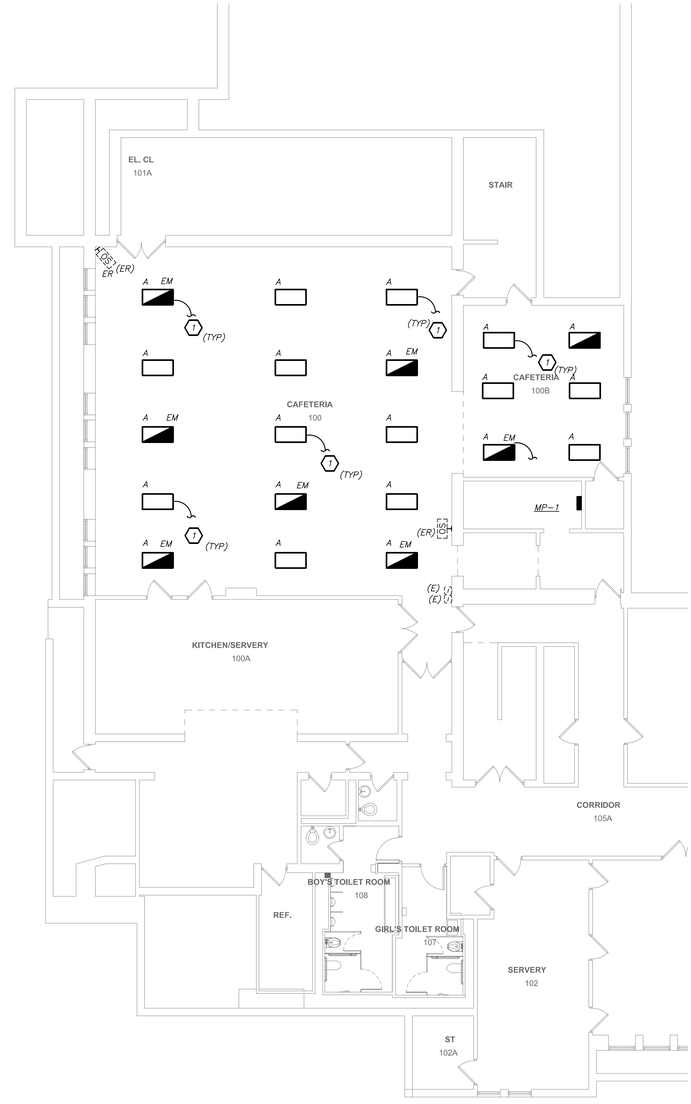


FOURTH FLOOR PART LIGHTING PLAN (NEW WORK)

2 / E201

0 8' 16'

1/8 inch=1 foot



FIRST FLOOR PART LIGHTING PLAN (NEW WORK)

1 / E201

0 8' 16'

1/8 inch=1 foot

WORK NOTES:

1. ELECTRICAL CONTRACTOR SHALL CONNECT NEW LIGHTING TO EXISTING CIRCUIT AVAILABLE AFTER THE DEMO WORK. EXISTING CONTROLS TO REMAIN. EXTEND ALL LIGHTING CONTROLS WIRING TO NEW LIGHTING FOR A COMPLETE OPERATIONAL SYSTEM.

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

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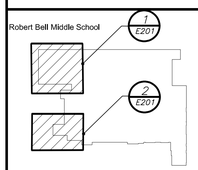

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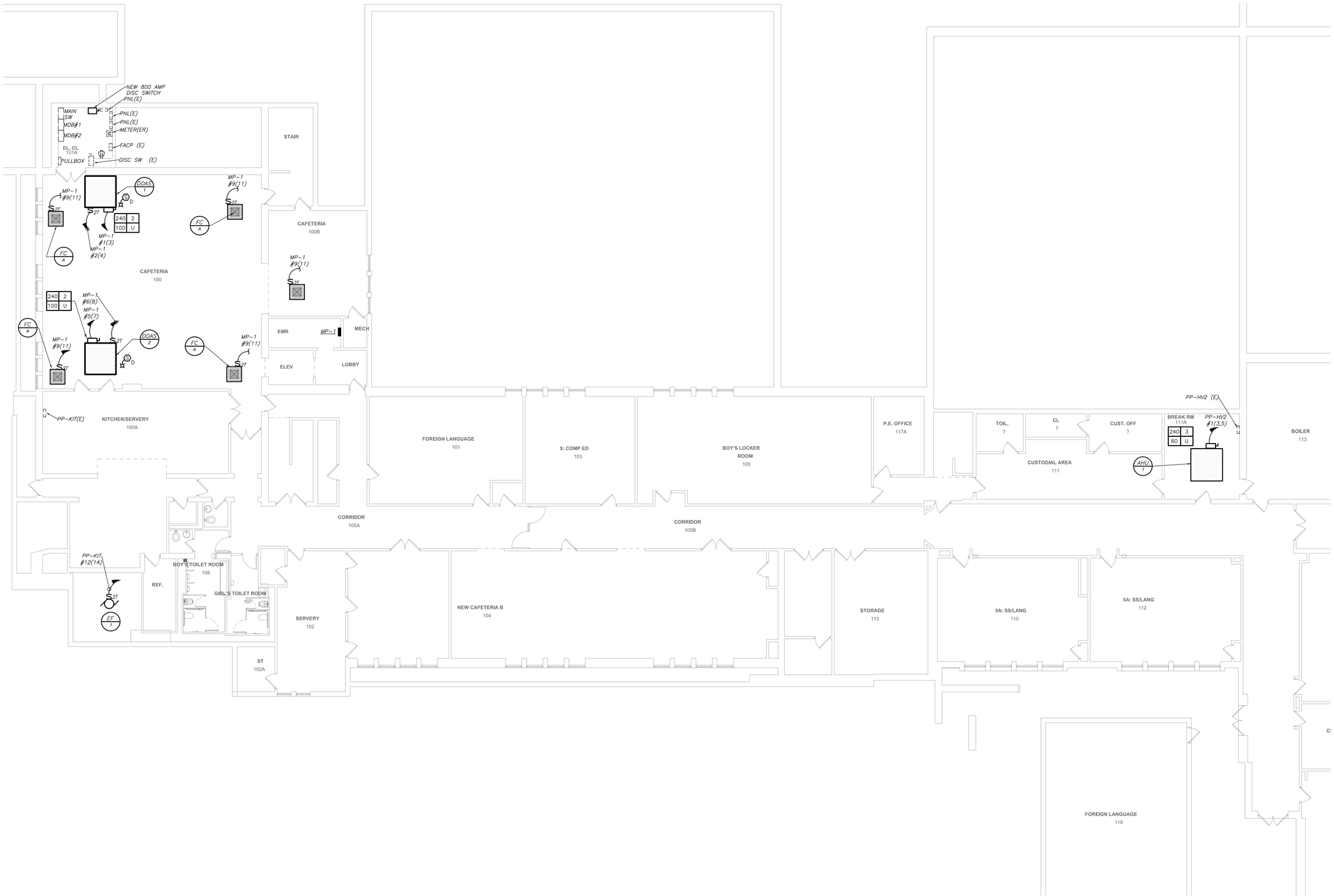
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

ROBERT E. BELL FIRST & FOURTH FLOOR PART LIGHTING PLAN

Job No. 2023-1028	Sheet Number E201-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



FIRST FLOOR PART FLOOR PLAN

1/E301

0 8" 16"
1/8" inch=1 foot

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

WORK NOTES:

1. EXISITNG HVAC UNIT SHALL BE DISCONNECTED AND RECONNECTED BY ELECTRICAL CONTRACTOR AFTER THE UNIT IS REFURBISHED BY HVAC CONTRACTOR.

DBE: TAB: Layout1 — Y:\CHAPPAQUA CSD\Chappaqua CSD — DW Capital Projects (2332.00)\Drawings\Electrical\BELL MS\233200E301.dwg — DATE: Sep 01, 2023 — 11:00am

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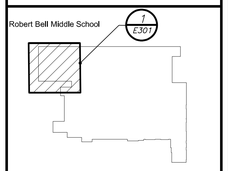

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Sheet Title
ROBERT E. BELL FIRST FLOOR PART POWER PLAN

Job No. 2023-1028	Sheet Number E301-BE
Date 08/31/2023	
Scale AS NOTED	
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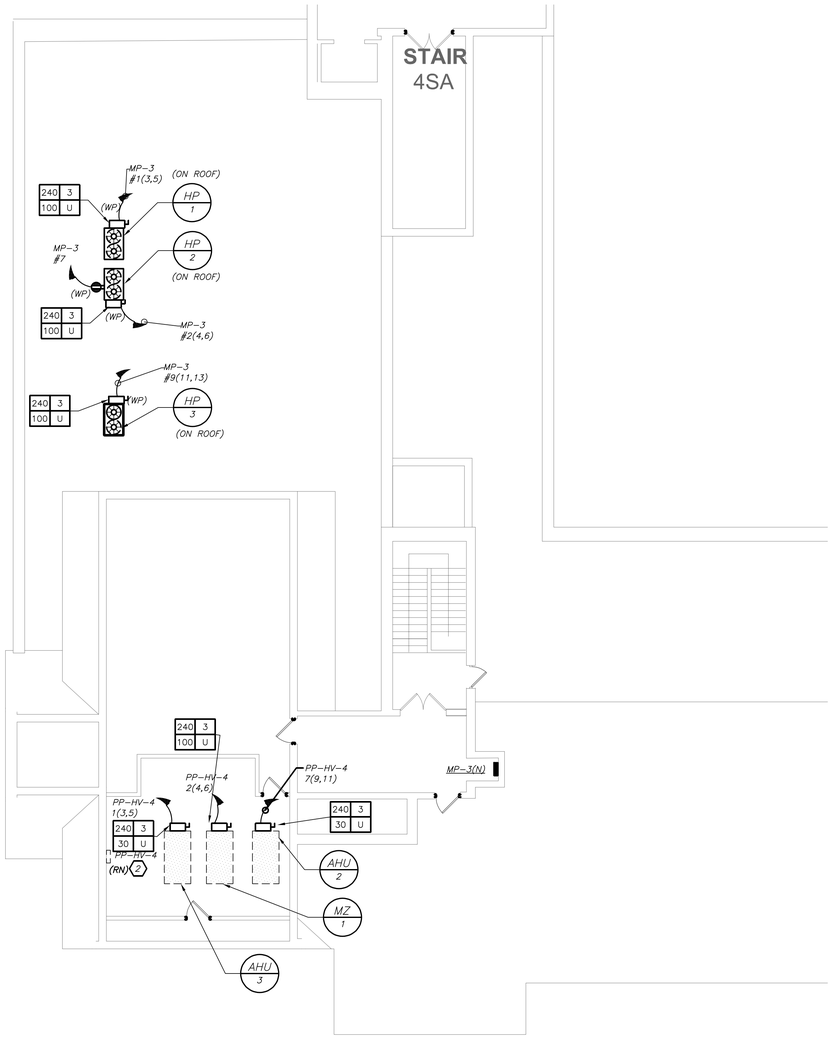


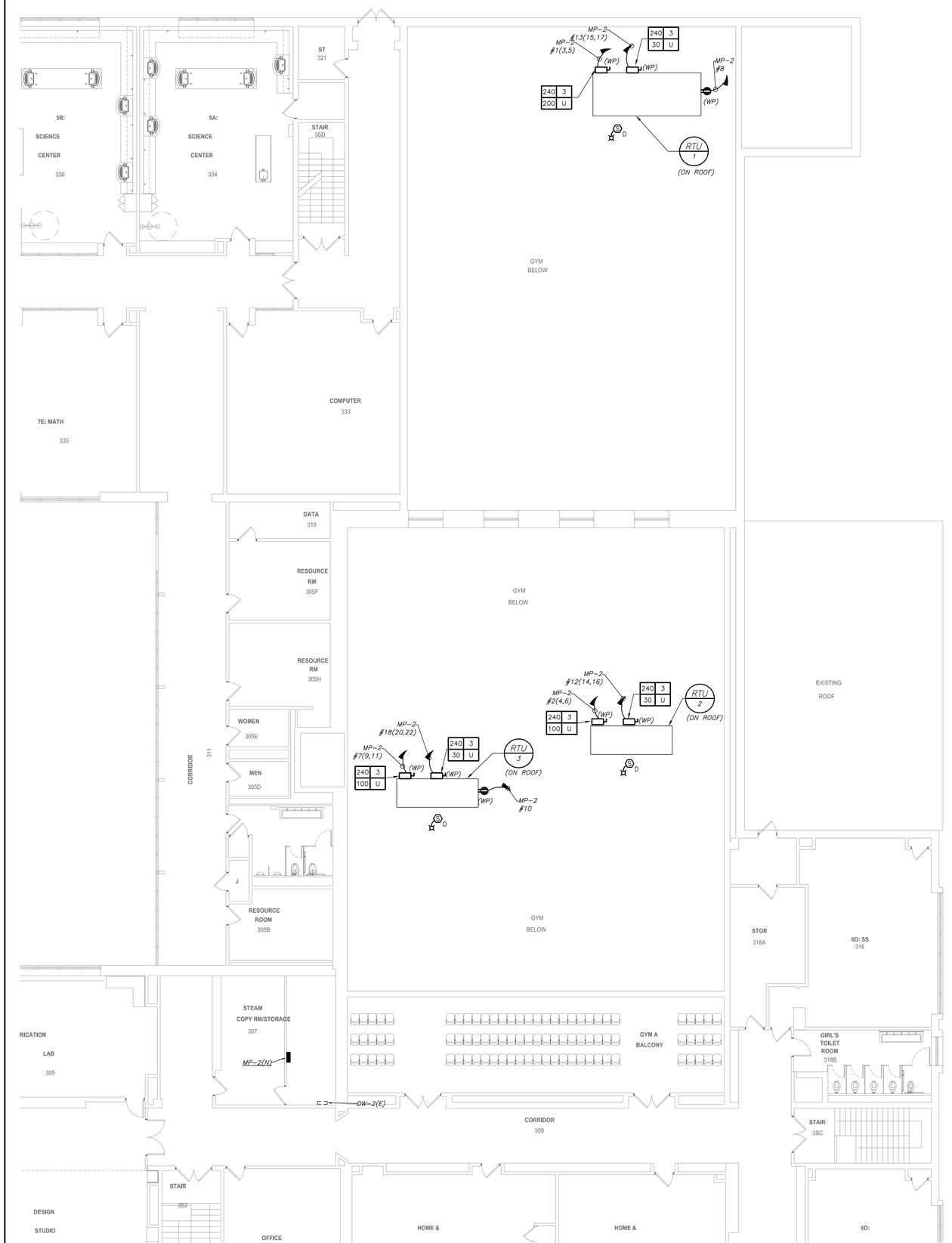
FOURTH FLOOR PART POWER PLAN

1 E302 — 0, 8', 16' — 1/8 inch=1 foot

WORK NOTES:

1. EXISITNG HVAC UNIT SHALL BE DISCONNECTED AND RECONNECTED BY ELECTRICAL CONTRACTOR AFTER THE UNIT IS REFURBISHED BY HVAC CONTRACTOR.
2. ELECTRICAL CONTRACTOR SHALL DISCONNECT ALL EXISTING CIRCUITS TO REMAIN, REMOVE EXISTING INTERNAL COMPONENTS, MAINTAIN EXISTING BACKBOX AND PROVIDE NEW INTERNAL COMPENENTS. PROVIDE CUSTOM INTERNAL COMPONENTS AND COVER AS REQUIRED. PROVIDE NEW CUSTOM 'DOOR-IN-DOOR' TRIM COVER. ANY DAMAGE CAUSED TO SURROUNDING WALL FINISHES SHALL BE PAIRED, PAINTED, ETC. TO MATCH EXISTING. RE-USE EXISTING CONDUITS/PATHWAY AND PROVIDE NEW FEEDERS, MATCH EXISTING FEEDER SIZE. EXTEND ALL WIRING AND CONDUIT AS NECESSARY FOR COMPLETE INSTALLATION. CONTRACTOR SHALL MATCH EXISTING CIRCUIT BREAKERS ARRANGEMENT.

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS



THIRD FLOOR PART POWERPLAN

1 E302 — 0, 8', 16' — 1/8 inch=1 foot

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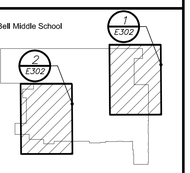

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ROBERT E. BELL THIRD & FOURTH FLOOR PART POWER PLAN

Job No. 2023-1028	Sheet Number E302-BE
Date 08/31/2023	
Scale AS NOTED	
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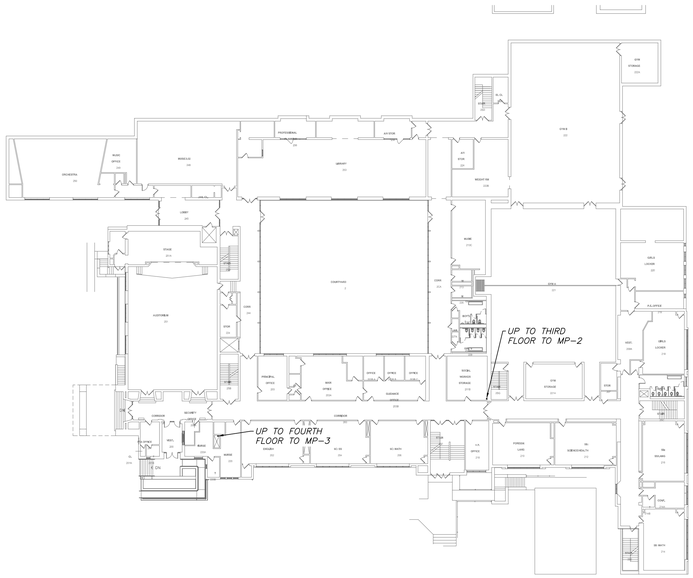
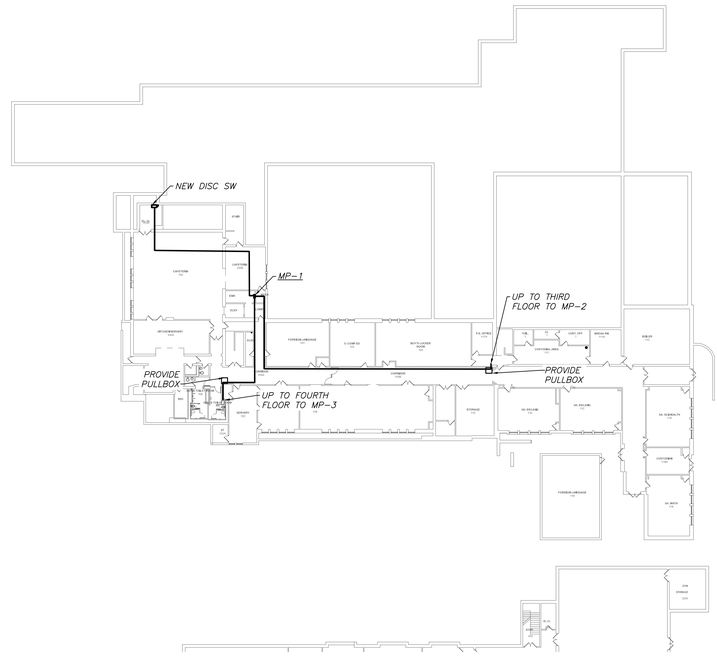


SECOND FLOOR CONDUIT ROUTING
(NEW WORK)

2 E303

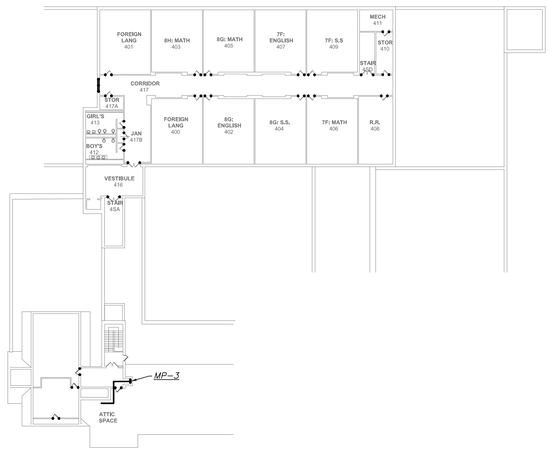
0 32' 64'
1/32 inch=1 foot



FIRST FLOOR CONDUIT ROUTING
(NEW WORK)

1 E303

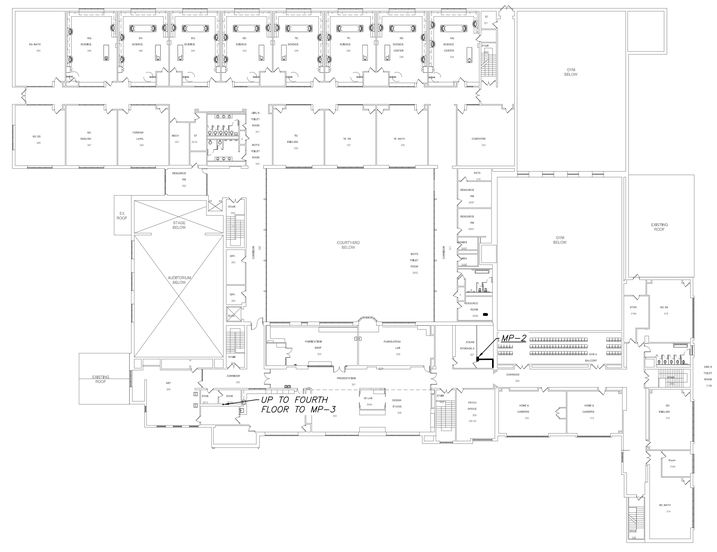
0 32' 64'
1/32 inch=1 foot



FOURTH FLOOR CONDUIT ROUTING
(NEW WORK)

4 E303

0 32' 64'
1/32 inch=1 foot



THIRD FLOOR CONDUIT ROUTING
(NEW WORK)

3 E303

0 32' 64'
1/32 inch=1 foot

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Sheet Title
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Job No. 2023-1028	Sheet Number E303-BE
Date 08/31/2023	
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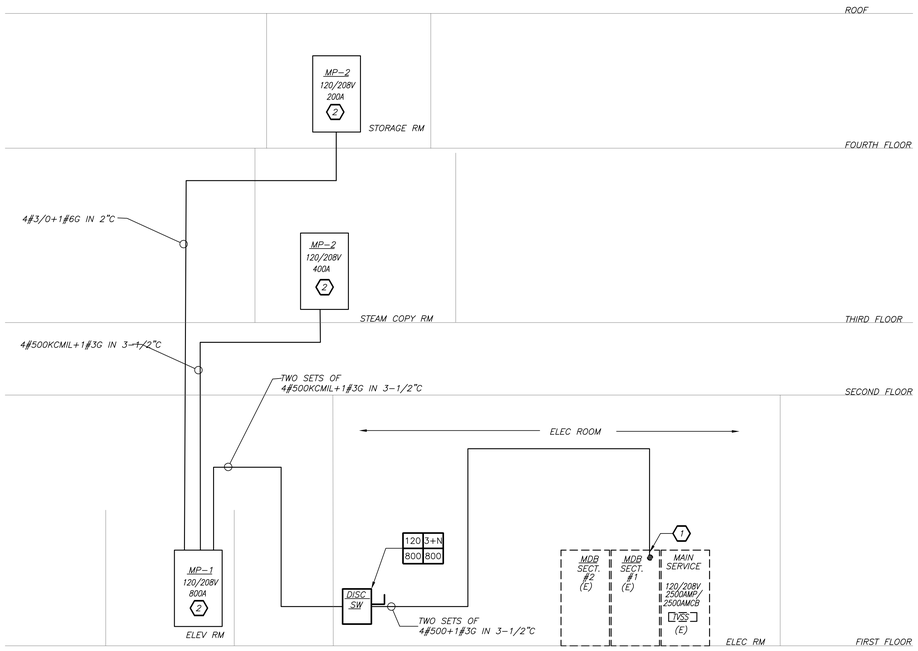
LIGHTING FIXTURE SCHEDULE

TYPE	MOUNTING	LAMPS	DESCRIPTION	MANUFACTURER & CAT.#
A	CEILING RECESSED MOUNTED	19W LED UNV	RECESSED 2X2, WITH ACRYLIC DIFFUSER, CENTER DIVIDE, 3500K COLOR TEMP, 2570 LUMENS 90 CRI AND 0-10V INTEGRAL DIMMING DRIVER.	MANUFACTURER: COLUMBIA VERSIFY CAT# VSY22-9-35-LWHE-G-ED-U
A EM	CEILING RECESSED MOUNTED	19W LED UNV	SAME AS FIXTURE "A" WITH INTEGRAL BATTERY PACK	MANUFACTURER: COLUMBIA VERSIFY CAT# VSY22-9-35-LWHE-G-ED-U-EMLED
B	PENDENT MOUNTED	75W LED UNV	CHAIN HUNG 1'X4' LED LIGHTING WITH NORMAL LENS AND "V" HOOKS	MANUFACTURER: PHILIPS DAYBRITE CAT# VLBX-70L-835-UNV-M-FXR-126-UD
B EM	PENDENT MOUNTED	75W LED UNV	SAME AS FIXTURE "B" WITH INTEGRAL BATTERY PACK	MANUFACTURER: PHILIPS DAYBRITE CAT# VLBX-70L-835-UNV-M-FXR-126-UD-EMLED
	SURFACE WALL/CEILING MOUNTED	1-5W 120V	L.E.D. TYPE EXIT LIGHT, STEEL HOUSING, NUMBER OF FACES AND DIRECTIONAL ARROWS AS INDICATED ON PLANS. SELF POWERED MODEL WITH 90 MINUTE EMERGENCY BATTERY PACK.	MANUFACTURER: ENCORE LIGHITNG CAT.#LSE-8-R-PER DWG

RISER NOTES.

(1) TAP EXISTING BUS AND PROVIDE ALL REQUIRED AND NECESSARY ACCESSORIES TO MATCH THE EXISTING DISTRIBUTION BOARD. SEE FEEDER SCHEDULE FOR WIRE SIZING. CONTRACTOR SHALL HIRE AS PART OF THIS CONTRACT A UL FIELD ENGINEERING SERVICE MEMBER TO RE-CERTIFY THE NEW BUS TAPPING THE EXISTING COPPER BUS IN THE EXISTING DISTRIBUTION BOARD TO AVOID ANY VIOLATION OF THE UL LISTING AND MEET UL LISTING REQUIREMENTS.

(2) NEW 120/208V 3 PHASE, 4WIRE PANELBOARD. REFER TO PANEL SCHEDULE FOR PANEL SIZE, TYPE AND CIRCUIT BREAKER ARRANGEMENT. PROVIDE ALL ACCESSORIES FOR COMPLETE INSTALLATION.



PARTIAL POWER RISER DIAGRAM (1 / E501) N.T.S.

NEW ELECTRICAL PANEL SCHEDULE

PNL: MP-3 | 208Y/120, 3 PHASE, 4 WIRE | 22 ,000MIN A.I.C. SYM | NEUTRAL: 100%

MOUNTING: (NEMA 1) SURFACE X / FLUSH / IN MCC | MAIN LUGS ONLY / DOUBLE LUGS / FEED THRU LUG / SHUNT TRIP MAIN | MAIN C BKR- 200A/3P | MAIN BUS - 200 A | GROUND BUS: X | ISOLATED GROUND BUS: | TVSS: | NUMBER OF POLES: 24

CKT No.	TRIP (AMP)	LOAD	WIRE	CND. (IN.)	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	CND. (IN.)	WIRE	LOAD	TRIP (AMP)	CKT No.
1	70	HP-1	3#4+1#8G	1 1/4	6.10			6.10			1 1/4	3#4+1#8G	HP-2	70	2
3						6.10			6.10						4
5	3						6.10			6.10				3	6
7	20	ROOF GFI	2#12+#12G	3/4	0.18						-	-	SPARE	20	8
9	70	HP-3	3#4+1#8G	1 1/4		6.10					-	-	SPARE	20	10
11							6.10				-	-	SPARE	20	12
13	3				6.10						-	-	SPARE	20	14
15	20	SPARE	-	-							-	-	SPARE	20	16
17	20	SPARE	-	-							-	-	SPARE	20	18
19	20	SPARE	-	-							-	-	SPARE	20	20
21	20	SPARE	-	-							-	-	SPARE	20	22
23	20	SPARE	-	-							-	-	SPARE	20	24
		SUBTOTALS			12.4	12.20	12.2	6.10	6.10	6.10			SUBTOTALS		
		TOTAL LOADS			18.5 KVA	PHASE A							LIGHTING:	0.00 KVA	
					18.3 KVA	PHASE B							RECEPTACLE:	0.00 KVA	
					18.3 KVA	PHASE C							KITCHEN:	0.00 KVA	
		TOTAL CONN. LOAD			55.1 KVA	153.0 A							MOTOR:	55.08 KVA	
		TOTAL DEMAND LOAD			55.1 KVA	153.0 A							POWER:	0.00 KVA	
													TOTAL:	55.08 KVA	

NEW ELECTRICAL PANEL SCHEDULE

PNL: MP-2 | 208Y/120, 3 PHASE, 4 WIRE | 22 ,000MIN A.I.C. SYM | NEUTRAL: 100%

MOUNTING: (NEMA 1) SURFACE X / FLUSH / IN MCC | MAIN LUGS ONLY / DOUBLE LUGS / FEED THRU LUG / SHUNT TRIP MAIN | MAIN C BKR- 350A/3P | MAIN BUS - 400A | GROUND BUS: X | ISOLATED GROUND BUS: | TVSS: | NUMBER OF POLES: 24

CKT No.	TRIP (AMP)	LOAD	WIRE	CND. (IN.)	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	CND. (IN.)	WIRE	LOAD	TRIP (AMP)	CKT No.
1	3	RTU-1	3#1/0+1#6G	2		14.0			6.90						
3							14.0			6.90	1 1/4	3#4+1#8G	RTU-2	3	2
5	150														4
7	3	RTU-3	3#4+1#8G	1 1/4		6.90								70	6
9							6.90	0.18			3/4	2#12+#12G	ROOF GFI	20	8
11	70								0.18		3/4	2#12+#12G	ROOF GFI	20	10
13	3	RTU-1 CP	2#12+#12G	3/4	0.60					0.60				3	12
15						0.60		0.60			3/4	2#12+#12G	RTU-2-CP		14
17	20						0.60		0.60					20	16
19	20	SPARE	-	-				0.60						3	18
21	20	SPARE	-	-					0.60		3/4	2#12+#12G	RTU-3 CP		20
23	20	SPARE	-	-										20	22
		SUBTOTALS			21.5	21.50	21.5	8.28	8.28	8.10			SUBTOTALS	20	24
		TOTAL LOADS			29.8 KVA	PHASE A							LIGHTING:	0.00 KVA	
					29.8 KVA	PHASE B							RECEPTACLE:	0.00 KVA	
					29.6 KVA	PHASE C							KITCHEN:	0.00 KVA	
		TOTAL CONN. LOAD			89.2 KVA	247.0 A							MOTOR:	89.16 KVA	
		TOTAL DEMAND LOAD			89.2 KVA	247.0 A							POWER:	0.00 KVA	
													TOTAL:	89.16 KVA	

NEW ELECTRICAL PANEL SCHEDULE

PNL: MP-1 | 208Y/120, 3 PHASE, 4 WIRE | 22 ,000MIN A.I.C. SYM | NEUTRAL: 100%

MOUNTING: (NEMA 1) SURFACE X / FLUSH / IN MCC | MAIN LUGS ONLY / DOUBLE LUGS / FEED THRU LUG / SHUNT TRIP MAIN | MAIN C BKR- 800A/3P | MAIN BUS - 800 A | GROUND BUS: X | ISOLATED GROUND BUS: | TVSS: | NUMBER OF POLES: 42

CKT No.	TRIP (AMP)	LOAD	WIRE	CND. (IN.)	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	KVA / PHASE A	KVA / PHASE B	KVA / PHASE C	CND. (IN.)	WIRE	LOAD	TRIP (AMP)	CKT No.
1	2	DOAS-1	3#4+1#8G	1 1/4	3.30			0.50			3/4	2#12+#12G	DOAS-1 CP	2	2
3	70					3.30			0.50					20	4
5	2	DOAS-2	3#4+1#8G	1 1/4			3.30			0.50	3/4	2#12+#12G	DOAS-2 CP	2	6
7	70				3.30			0.50						20	8
9	2	FCU-A	2#12+#12G	3/4		3.30			18.30					3	10
11	20						3.30			18.30		SEE RISER	MP-3		12
13	2	MP-2	SEE RISER		29.60			18.3						200	14
15						29.60					-	-	SPARE	20	16
17	400						29.60				-	-	SPARE	20	18
19	20	SPARE	-	-							-	-	SPARE	20	20
21	20	SPARE	-	-							-	-	SPARE	20	22
23	20	SPARE	-	-							-	-	SPARE	20	24
25	20	SPARE	-	-							-	-	SPARE	20	26
27	20	SPARE	-	-							-	-	SPARE	20	28
29	20	SPARE	-	-							-	-	SPARE	20	30
31	20	SPARE	-	-							-	-	SPARE	20	32
33	20	SPARE	-	-							-	-	SPARE	20	34
35	20	SPARE	-	-							-	-	SPARE	20	36
37	20	SPARE	-	-							-	-	SPARE	20	38
39	20	SPARE	-	-							-	-	SPARE	20	40
41	20	SPARE	-	-							-	-	SPARE	20	42
		SUBTOTALS			36.20	36.20	36.20	19.3	18.80	18.80			SUBTOTALS		
		TOTAL LOADS			55.5 KVA	PHASE A							LIGHTING:	0.00 KVA	
					55.0 KVA	PHASE B							RECEPTACLE:	0.00 KVA	
					55.0 KVA	PHASE C							KITCHEN:	0.00 KVA	
		TOTAL CONN. LOAD			166 KVA	459.0 A							MOTOR:	165.50 KVA	
		TOTAL DEMAND LOAD			166 KVA	459.0 A							POWER:	0.00 KVA	
													TOTAL:	165.50 KVA	

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

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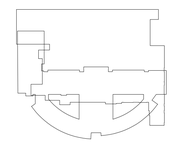
Key Plan
Robert Bell Middle School



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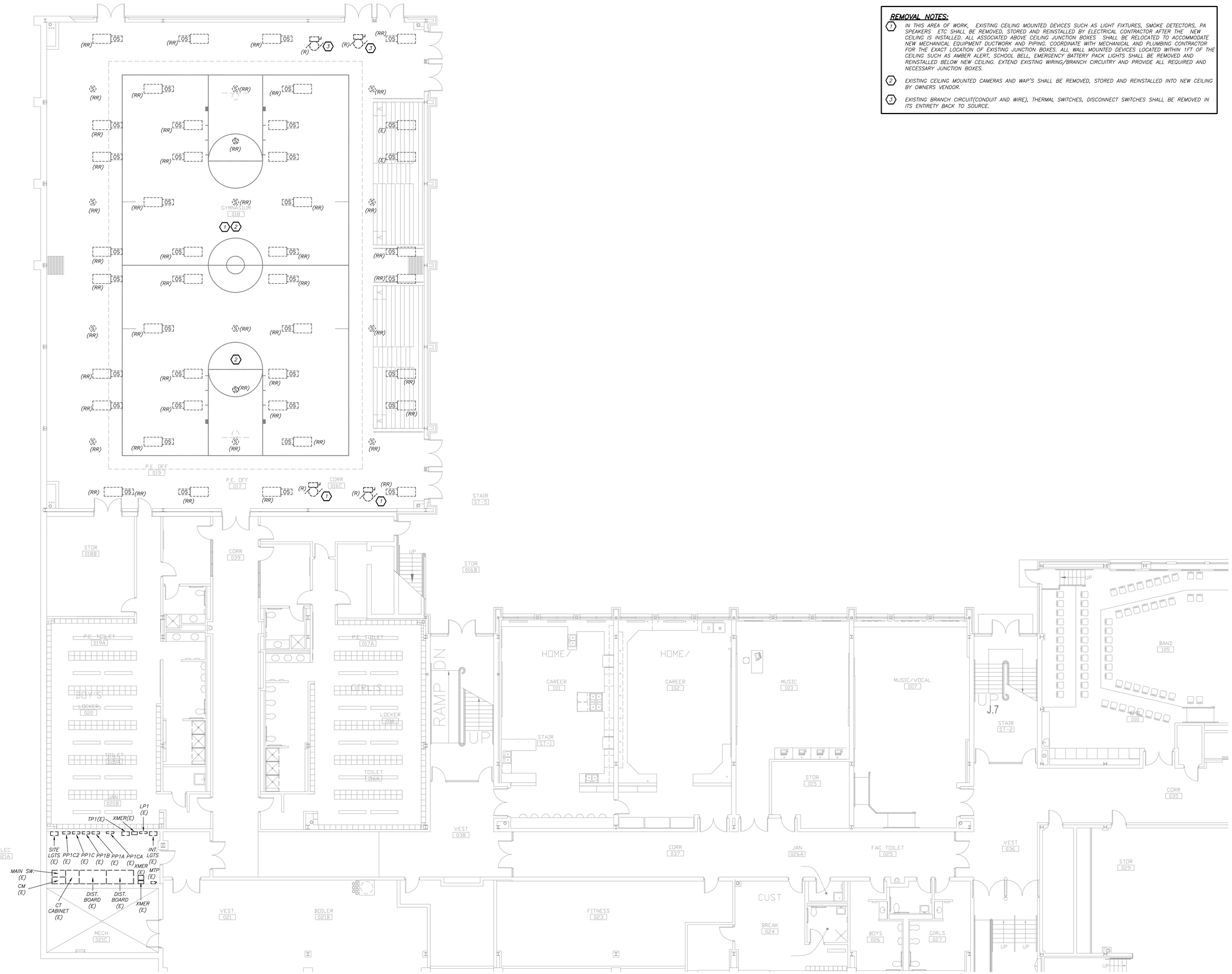
No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title
ROBERT E. BELL PART POWER RISER AND SCHEDULES

Job No. 2023-1028	Sheet Number E501-BE
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



REMOVAL NOTES:

1. IN THIS AREA OF WORK, EXISTING CEILING MOUNTED DEVICES SUCH AS LIGHT FIXTURES, SMOKE DETECTORS, PA SPEAKERS ETC SHALL BE REMOVED, STORED AND REINSTALLED BY ELECTRICAL CONTRACTOR AFTER THE NEW CEILING IS INSTALLED. ALL ASSOCIATED ABOVE CEILING JUNCTION BOXES SHALL BE RELOCATED TO ACCOMMODATE NEW MECHANICAL EQUIPMENT DUCTWORK AND PIPING. COORDINATE WITH MECHANICAL AND PLUMBING CONTRACTOR FOR THE EXACT LOCATION OF EXISTING JUNCTION BOXES. ALL WALL MOUNTED DEVICES LOCATED WITHIN 1FT OF THE CEILING SUCH AS AMBER ALERT, SCHOOL BELL, EMERGENCY BATTERY PACK LIGHTS SHALL BE REMOVED AND REINSTALLED BELOW NEW CEILING. EXTEND EXISTING WIRING/BRANCH CIRCUITRY AND PROVIDE ALL REQUIRED AND NECESSARY JUNCTION BOXES.
2. EXISTING CEILING MOUNTED CAMERAS AND WAP'S SHALL BE REMOVED, STORED AND REINSTALLED INTO NEW CEILING BY OWNERS VENDOR.
3. EXISTING BRANCH CIRCUIT(CONDUIT AND WIRE), THERMAL SWITCHES, DISCONNECT SWITCHES SHALL BE REMOVED IN ITS ENTIRETY BACK TO SOURCE.

BEFORE FABRICATION THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS

LOWER LEVEL PART REMOVAL PLAN
(REMOVALS & REINSTALLATIONS)

1 / E101

0 4' 8' 16'
1/8 inch=1 foot

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CHAPPAQUA CENTRAL SCHOOL DISTRICT
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Chappaqua, NY 10514

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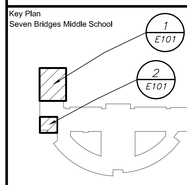
Key Plan
Seven Bridges Middle School



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No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title
SEVEN BRDIGES LOWER LEVEL PART REMOVAL PLAN

Job No. 2023-1028	Sheet Number E101-SB
Date 08/31/2023	
Scale AS NOTED	
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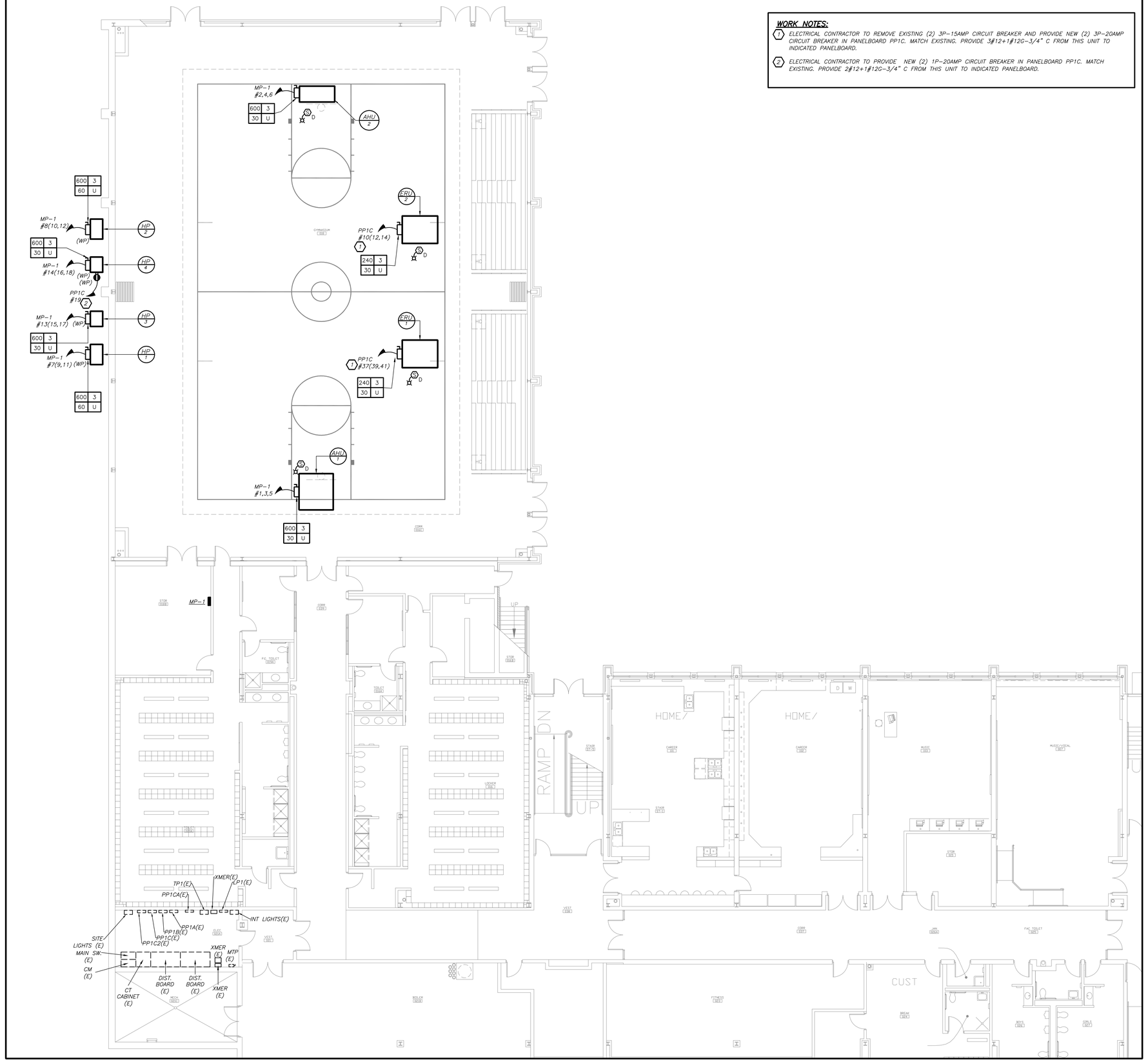

WORK NOTES:

1. *ELECTRICAL CONTRACTOR TO REMOVE EXISTING (2) 3P–15AMP CIRCUIT BREAKER AND PROVIDE NEW (2) 3P–20AMP CIRCUIT BREAKER IN PANELBOARD PP1C. MATCH EXISTING. PROVIDE 3#12+1#12G–3/4" C FROM THIS UNIT TO INDICATED PANELBOARD.*
2. *ELECTRICAL CONTRACTOR TO PROVIDE NEW (2) 1P–20AMP CIRCUIT BREAKER IN PANELBOARD PP1C. MATCH EXISTING. PROVIDE 2#12+1#12G–3/4" C FROM THIS UNIT TO INDICATED PANELBOARD.*

LOWER LEVEL PART POWER PLAN (NEW WORK) 1 / E301

0 4' 8' 16'
1/8 inch=1 foot

BEFORE FABRICATION, THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AND CONDITIONS ON JOB AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS.

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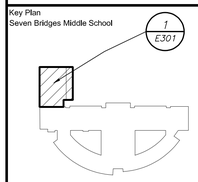
Key Plan
Seven Bridges Middle School



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2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

SEVEN BRDIGES LOWER LEVEL PART POWER PLAN

Job No. 2023-1028	Sheet Number E301-SB
Date 08/31/2023	
Scale AS NOTED	
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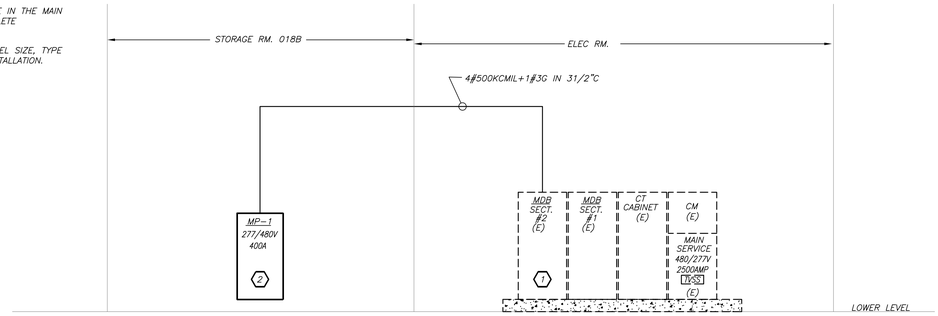
WORK NOTES.

1. PROVIDE NEW 400 AMP 480/277V 3P 4W CIRCUIT BREAKER IN THE AVAILABLE SPACE IN THE MAIN SWITCHBOARD, MATCH EXISTING. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE INSTALLATION.
2. NEW 480/277V 3 PHASE, 4WIRE PANELBOARD. REFER TO PANEL SCHEDULE FOR PANEL SIZE, TYPE AND CIRCUIT BREAKER ARRANGEMENT. PROVIDE ALL ACCESSORIES FOR COMPLETE INSTALLATION.



PARTIAL POWER RISER DIAGRAM 1/E501 N.T.S.

NEW **ELECTRICAL PANEL SCHEDULE**

PNL: MP-1				MOUNTING:	SURFACE	X		MAIN LUGS ONLY			MAIN C BKR-		GROUND BUS:	X					
480Y/277, 3 PHASE, 4 WIRE				(NEMA 1)	FLUSH			DOUBLE LUGS			400A/3P		ISOLATED GROUND BUS:						
22 ,000MIN A.I.C. SYM					IN MCC			FEED THRU LUG			MAIN BUS -		TVSS:						
NEUTRAL: 100%								SHUNT TRIP MAIN			400 A		NUMBER OF POLES:	42					
CKT No.	TRIP (AMP)	LOAD	WIRE	CND. (IN.)	KVA / PHASE A	B	C	KVA / PHASE A	B	C	CND. (IN.)	WIRE	LOAD	TRIP (AMP)	CKT No.
1	3	AHU-1	3#12+12G	3/4	2.30			2.30			3/4	2#12+#12G	AHU-2	3	2
3						2.30			2.30						4
5	20						2.30			2.30				20	6
7	3	HP-1	3#8+1#10G	3/4	11.5			11.5			3/4	3#8+1#10G	HP-2	3	8
9						11.5			11.5						10
11	50						11.5			11.5				50	12
13	3	HP-3	3#12+1#12G	3/4	3.50			3.50			3/4	2#12+#12G	HP-4	3	14
15						3.50			3.50						16
17	20						3.50			3.50				20	18
19	20	SPARE	-	-							-	-	SPARE	20	20
21	20	SPARE	-	-							-	-	SPARE	20	22
23	20	SPARE	-	-							-	-	SPARE	20	24
25	20	SPARE	-	-							-	-	SPARE	20	26
27	20	SPARE	-	-							-	-	SPARE	20	28
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31	20	SPARE	-	-							-	-	SPARE	20	32
33	20	SPARE	-	-							-	-	SPARE	20	34
35	20	SPARE	-	-							-	-	SPARE	20	36
37	20	SPARE	-	-							-	-	SPARE	20	38
39	20	SPARE	-	-							-	-	SPARE	20	40
41	20	SPARE	-	-							-	-	SPARE	20	42
		SUBTOTALS			17.3	17.3	17.3	17.3	17.3	17.3			SUBTOTALS		

TOTAL LOADS	34.6 KVA	PHASE A	LIGHTING: 0.00 KVA
	34.6 KVA	PHASE B	RECEPTACLE: 0.00 KVA
	34.6 KVA	PHASE C	KITCHEN: 0.00 KVA
TOTAL CONN. LOAD	104 KVA	125 A	MOTOR: 103.80 KVA
TOTAL DEMAND LOAD	104 KVA	125 A	POWER: 0.00 KVA
			TOTAL: 103.80 KVA

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DISTRICT-WIDE CAPITAL IMPROVEMENTS - MIDDLE SCHOOLS

CHAPPAQUA CENTRAL SCHOOL DISTRICT
66 Roaring Brook Road
Chappaqua, NY 10514

KG+D listen imagine build
KG+D ARCHITECTS, PC
285 MAIN STREET•MOUNT KISCO, NEW YORK 10549
P: 914.666.5900 KGDARCHITECTS.COM

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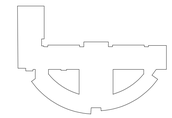
CONSULTING ENGINEERS
39 MARBLE AVE PLEASANTVILLE, NY 10570
914.328.6060 GENERAL@BGA-ENG.com www.BGA-ENG.com

Key Plan
Seven Bridges Middle School



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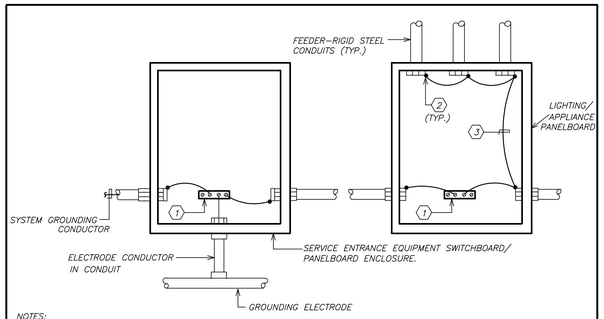
No.	Date	Issue
2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

SEVEN BRDIGES RISER & SCHEDULE

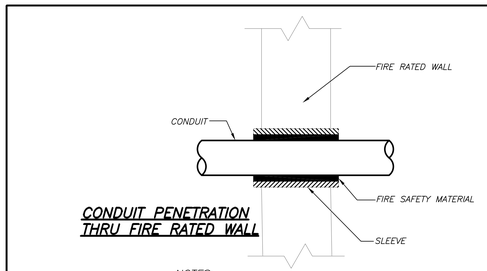
Job No. 2023-1028	Sheet Number E501-SB
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	



NOTES:

1. PANELBOARD GROUND BUS
2. GROUNDING BUSHING
3. GROUNDING CONDUCTOR

RACEWAY EQUIPMENT GROUNDING SYSTEM 3/E701 N.T.S.



CONDUIT PENETRATION THRU FIRE RATED WALL

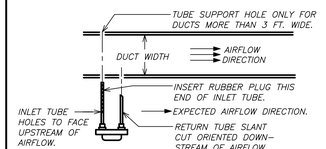
NOTES:

USE WHERE CONDUITS PASS THRU FIRE RATED WALL.

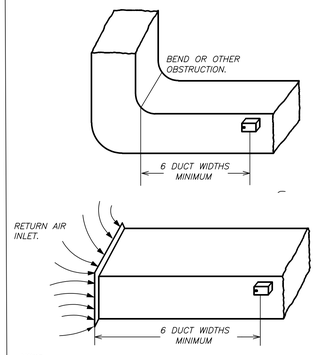
WHERE CONDUITS PASS THRU CONCRETE BEAM, BRICK WALL, OR WATER PROOF FLOORS, USE PIPE SLEEVES.

CONDUIT PENETRATION DETAILS 2/E701 N.T.S.

INLET TUBE ORIENTATION

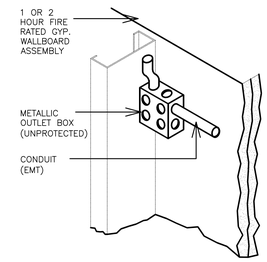


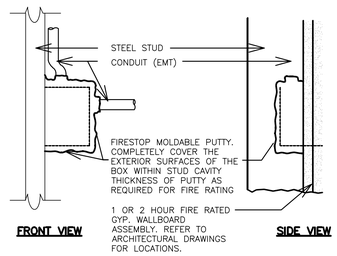
INLET TUBE ORIENTATION 1B/E701 N.T.S.



NOTE:
1. PROVIDE DUCT DETECTOR ON RETURN SIDE OF DUCT WORK FOR UNITS GREATER THAN 2000CFM AS PER INTERNATIONAL CODE 606.2.1.
2. FOR UNITS GREATER THAN 15,000CFM SERVING MULTIPLE FLOORS PROVIDE DUCT DETECTOR ON EACH FLOOR WHERE IT PENETRATES AS PER INTERNATIONAL CODE 606.2.3.

TYPICAL DUCT DETECTOR PLACEMENT ON RETURN SIDE OF DUCT. 1A/E701 N.T.S.

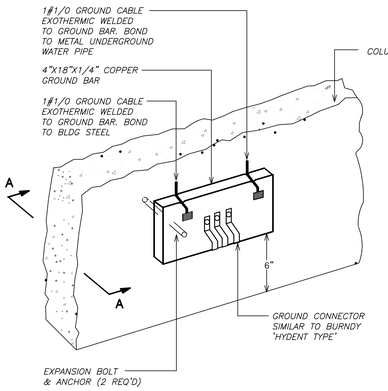


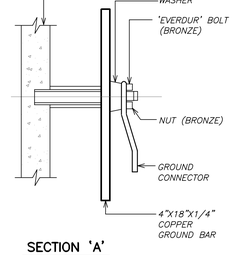


FRONT VIEW SIDE VIEW

NOTES:
1. CLEARANCE BETWEEN OUTLET BOX AND WALL BOARD 1/8" MAX.
2. PROVIDE FIRE STOPPING IF:
   A. THE SURFACE AREA OF INDIVIDUAL METALLIC OUTLET OR SWITCH BOXES EXCEEDS 16 SQ. INCHES.
   B. THE AGGREGATE SURFACE AREA OF THE BOXES EXCEEDS 100 SQ. INCHES PER 100 SQ. FT. OF WALL SURFACE.
3. BOXES LOCATED ON OPPOSITE SIDE OF WALLS OR PARTITIONS SHALL BE SEPARATED BY A MINIMUM HORIZONTAL DISTANCE OF 24". MINIMUM DISTANCE SEPARATION MAY BE REDUCED WHEN OPENING PROTECTIVE MATERIAL ARE INSTALLED TO THE REQUIREMENTS OF THEIR CLASSIFICATION.
4. USE THE APPROPRIATE FIRESTOPPING PUTTY FOR METALLIC OR NON-METALLIC OUTLET BOXES RESPECTIVELY.

DETAIL OF WALL BOX FIRE PROTECTION 5/E701 N.T.S.





SECTION 'A'
N.T.S.

GROUND BAR DETAIL 4/E701 N.T.S.

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2	08/31/2023	ISSUE FOR PRICING - 90% CD
1	06/10/2023	SCHEMATIC DESIGN

Sheet Title

DETAILS

Job No. 2023-1028	Sheet Number E701
Date 08/31/2023	
Scale AS NOTED	
Drawn / Checked BGA/BGA	

AHERA 3-YEAR RE-INSPECTION REPORT
AND MANAGEMENT PLAN
of
ASBESTOS CONTAINING MATERIALS

Performed at:

ROBERT E. BELL MIDDLE SCHOOL

Performed for:

CHAPPAQUA
Central School District

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, NY 10514

Prepared by:

500 Summit Lake Drive, Suite 450
Valhalla, New York 10595
Tel. (914) 747-1120

Project No. 31403475.032

Submission: August 2022

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APPENDIX 4: AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM
APPENDIX 5: BULK SAMPLE ANALYSIS RESULTS AND PREVIOUS SAMPLING DATA
APPENDIX 6: INSPECTOR AND MANAGEMENT PLANNER CERTIFICATIONS
APPENDIX 7: SUMMARY OF ABATEMENT ACTIVITIES
APPENDIX 8: 40 CFR PART 763 (EPA AHERA)

1.0 SCOPE OF WORK

On October 30, 1987, the U.S. Government issued a final rule under Section 203 of Title II of the Toxic Substances Control Act (TSCA) entitled Asbestos Containing Materials in Schools, 40 CFR Part 763 (as amended through December 31, 2002). The Environmental Protection Agency (EPA) was charged with enforcing this ruling, which was the result of federal legislation known as the Asbestos Hazard Emergency Response Act (AHERA). This action represented a substantial expansion of the 1982 version of 40 CFR Part 763, and placed following additional burdens on the Local Education Agency (LEA):

- All local education agencies (LEAs) identify ACBM in their school buildings. Once doing so, the LEAs must submit a Management Plan to the State Education Department by October 12, 1988.

- At least once every six months after the Management Plan is in effect; the LEA Designee shall conduct a periodic surveillance in each school building containing ACBM. Non-accredited personnel may perform the periodic surveillance. The surveillance requires that a visual inspection of all areas that have been identified in the Management Plan as ACBM be conducted and any changes in the condition of the ACBM be noted. This information shall be recorded as well as the date and the name of the person performing the surveillance. This information should be submitted to Designated Person to be included in the Management Plan.

- At least once every three years, the LEA must have a re-inspection of its building. The re-inspection must be performed by an accredited inspector who should recheck all ACBM or assumed ACBM and reassess any changes in its condition. This information should be included within the Management Plan.

WSP has been retained by Chappaqua Central School District (CCSD) to perform the 2022 AHERA 3-year re-inspection of their school district. The re-inspection process consists of four phases prior to final submission. The four phases are: 1) management plan review, 2) field inspection, 3) update of the original management plan, and 4) review of the new, updated management plan with the LEA Designee of the school district.

1.1 ORIGINAL MANAGEMENT PLAN REVIEW

The initial phase requires the accredited inspector and/or management planner to review the original management plan. The inspector ascertains for each school building in the district, all the materials that were assumed or confirmed to contain asbestos through bulk sample analysis. The locations, material type (surfacing, thermal system insulation (TSI), or miscellaneous), and quantities for each homogeneous area are identified.

Based on the information compiled during the management plan review provided by the school district, the inspector then develops a field re-inspection form which will be utilized in phase 2 (field inspection).

1.2 FIELD INSPECTION

The second phase is the actual inspection of the materials assumed or confirmed to contain asbestos in the original management plan for each building. The inspector enters a space, which was shown to contain asbestos during the original inspection. The inspector determines if the ACBM(s) is still present in the room or if it has been abated. If the ACBM(s) is still present, the inspector confirms the quantity of material(s), checks to see if the material(s) is friable and observes the condition of the material(s) for damage. This information is then recorded on the field inspection forms. Additionally, any useful information, which may be used in updating the management plan, is noted. The inspector continues the process throughout each school building.

If during the inspection the inspector observes any previously unidentified suspect materials, a bulk sample may be collected to determine if the material contains asbestos. Bulk samples are taken only with the approval of the LEA Designee of the school district. If bulk samples are not collected, then the material is assumed to contain asbestos.

On June 14, 2022 an AHERA re-inspection of the Chappaqua CSD schools was performed by the following NYS/AHERA accredited inspector(s).

Name	NYSDOL #	Exp. Date
Dmitri Kirnossenko	07-01720	**08/22**

The management plan was developed by the following NYS/AHERA accredited Management Planner(s):

Name	NYSDOL #	Exp. Date
Alexander Smolyar	12-07624	**10/22**

Note: Copies of current certificates are included in Appendix 6.

This inspection report updates the information and conditions on all ACBM described and assessed in the original report(s). In addition, any ACBM which was not identified in the original inspection but was discovered during this survey has been included in this report.

1.3 UPDATE OF THE ORIGINAL MANAGEMENT PLAN

The third phase of the re-inspection is updating the original management plan. The management plan is written by a state certified management planner. The inspector sorts the data collected during the actual inspection into tabulated forms based on the space I.D. # and the type of material. The Management Planner then determines the necessary response actions required to be taken by the school district in order to maintain the ACBM and develops the new, updated management plan.

1.4 UPDATE MANAGEMENT PLAN REVIEW WITH DISTRICT LEA DESIGNEE

The fourth phase of the re-inspection is a review of the updated management plan with the school district's LEA Designee in order to familiarize the LEA Designee with the information contained in the management plan. The Management Planner and the LEA Designee review the data collected and the response actions recommended. Any appropriate recommendations made by the LEA Designee are incorporated into the management plan before final submission. The LEA Designee then signs the final copy of the management plan.

In the future, the Management Plan must be updated whenever an abatement of ACBMs is performed. The six-month periodic surveillance of the school district is still required after the re-inspection.

In New York State, the School Asbestos Safety Act (SASA) located in the New York State Education Law Sections 430 through 437, also requires the LEA for the District to re-inspect the buildings for ACBM every three years. SASA requires the LEA to submit the AHERA 3-year re-inspection data to the New York State Education Department via electronic reporting form. These forms are generally supplied to the District at the beginning of the re-inspection with dates when the re-inspection must be completed and submitted by.

This 3-year re-inspection cannot accurately determine all ACM that may be present in or behind walls, ceilings and floors. Before the start of any renovation project, existing plans and specifications regarding the building materials used in construction (i.e. plaster materials, gypsum board, pipe insulation, etc.) should be reviewed. If necessary, access holes may be made in the walls, ceilings and/or floor to look for ACM pipe insulation. Properly trained personnel should perform this work. If a suspect material is found, bulk sampling should be conducted prior to construction to protect workers from possible exposure and contamination.

During the original inspection, not all varieties of floor tiles used in the buildings were sampled and analyzed. Some floor tiles were assumed to contain asbestos. These tiles are non-friable as long as they remain in good condition. The floor tile, floor tile mastic, and/or the under lying felt paper must be sampled prior to any renovation or removal project which will disturb the materials.

Fire doors have also been assumed to contain asbestos in the core as a fire retardant. If the doors are to be removed, drilled or affected where the interior would be exposed, the necessary precautions should be taken.

Roofing materials, which are not covered by the 3-year re-inspection, should be considered as suspect materials. Core samples down to the substrate of all homogeneous roofing materials should be collected and analyzed for asbestos before the start of any renovation project.

Bulk sample collection must be conducted by a NYSDOL licensed inspector(s) with valid certificate(s), and an ELAP accredited laboratory should perform all bulk sample analysis.

The Operations and Maintenance Plan found in Section 4.0 of the management plan must be kept up to date. It contains important information for working with and maintaining materials that contain asbestos.

2.0 SITE DESCRIPTION

Robert E. Bell Middle School
50 Senter Street
Chappaqua, New York 10514
Number of Levels: Four (4) Levels
Re-inspection Date(s): June 14, 2022
Building Contains: Friable and Non-Friable

3.0 ASSESSMENT OF ACBM

3.1 ACBM CATEGORIES

The ACBM's at the school were inspected and described in each building space accessible by nondestructive means. The inspector(s) assessed all friable known or assumed ACBM in the school building in accordance with 40 CFR Part 763.88. In addition, all other non-friable ACBM were also assessed. Hazardous Assessment form, which is located in Appendix 3, lists a space by space description of the ACBM and their appropriate response actions.

The ACBM and assumed ACBM were classified according to these categories in 40 CFR Part 763.88:

1. **DAMAGED OR SIGNIFICANTLY DAMAGED THERMAL SYSTEM INSULATION (TSI).** Plumbing and HVAC mechanical equipment insulation with greater than 1 percent damage;

2. **DAMAGED FRIABLE SURFACING ACBM.** Sprayed or troweled on coating material applied to interior structural components. Damaged less than 10 percent (evenly distributed throughout the material) or 25 percent (localized);

3. **SIGNIFICANTLY DAMAGED FRIABLE SURFACING ACBM.** Same description as No. 2 with damage extent greater than 10 percent (distributed) or 25 percent (localized);

4. **DAMAGED OR SIGNIFICANTLY DAMAGED FRIABLE MISCELLANEOUS ACBM.** Friable ACBM, excluding thermal system insulation or surfacing material with damage greater than 1 percent;

5. **ACBM WITH POTENTIAL FOR DAMAGE.** Material susceptible to physical, water or other damages;

6. **ACBM WITH THE POTENTIAL FOR SIGNIFICANT DAMAGE.** Material easily susceptible to physical, water or other damages;

7. **ANY REMAINING FRIABLE ACBM OR FRIABLE SUSPECTED ACBM.**

The ACBM's in each functional space were assessed as to the location and quantity of material, friability, severity of damage (percentage of total amount), extent of damage (scattered or localized), and type of damage (flaking, blistering, water damage or other signs of physical damage). Other considerations that were taken into account included whether the material was accessible, the material's potential for disturbance, known or suspected causes of damage (e.g., air erosion, vandalism, vibration, water, etc.), and preventive measures which might eliminate the reasonable likelihood of undamaged ACM from becoming significantly damaged.

3.2 RESPONSE ACTIONS

According to 40 CFR Part 763.88(d), the LEA shall select a person fully accredited to develop management plans. NYS and AHERA accredited personnel reviewed the results of the inspection and assessment for the facility. When choosing among the various response actions, a number of factors were taken into consideration including, but not limited to, damage, potential for damage, type of material, and any planned renovations or change of use for the building area. The response actions were planned following a 2 fold strategy. First, in order to eliminate any imminent health risk, all areas which contain significantly damaged ACBM will be abated in a timely fashion. The second series of response actions are to repair, or abate where repair is not feasible, damaged ACBM. The final series of response actions are primarily precautionary steps to ensure that damage is not inflicted upon ACBM which currently exists in an intact state. The specific action taken will depend upon accessibility of the area, current occupancy, and the degree of any possible air erosion. These areas, as well as all remaining ACBM, shall be under constant surveillance until the material is ultimately removed.

Hazardous Assessment Form identifies the recommended appropriate response actions on a space by space basis. At a minimum, the response actions conform with 40 CFR Part 763.90. These response actions are consistent with the assessments and are intended to protect human health and the environment.

Hazardous Assessment Form, found in Appendix 4 of this report, list the response actions in the form of these three response action codes:

1. **REMOVAL**
2. **REPAIR**
3. **OPERATIONS & MAINTENANCE (O&M)**

Combinations of response action codes for each functional space represent the recommended actions to be performed in order to comply with minimum responses outlined under 40 CFR Part 763.90. It is the LEA's responsibility to ensure implementation of the appropriate response action consistent with the assessment findings. The LEA shall arrange to have the actions designed and completed by NYS and EPA accredited persons. The LEA shall select those response actions which protect human health and the environment, according to the least burdensome method.

If damaged or significantly damaged asbestos containing TSI is present, the LEA must at least clean the area surrounding the damage and repair the damage points. It is recommended that all TSI be included in an Operations and Maintenance (O&M) program according to 40 CFR Part 763.91 and as part of the management plan. Removal of asbestos containing TSI is recommended whenever economically feasible or when school renovation and/or demolition may impact on the material.

If damaged friable surfacing ACBM or damaged friable miscellaneous ACBM has been identified, the LEA may choose encapsulation, enclosure, removal or repair of the damaged material. The AHERA regulation requires the LEA to determine which of the appropriate response actions best protects human health and the environment. The LEA may then determine the least burdensome

response action based on local circumstances such as building occupancy and use patterns and economic concerns such as short and long term costs. Wherever this material has been repaired, encapsulated or enclosed, the LEA should implement an O&M program until the material has been removed.

If significantly damaged friable surfacing or miscellaneous ACBM is present, the LEA shall determine whether there is a need to isolate and/or restrict access to the functional space. The LEA must then encapsulate, enclose or remove as necessary to protect human health and the environment. Where material has been repaired, encapsulated or enclosed, the LEA shall implement an O&M program until the material has been removed.

If any surfacing, thermal system or miscellaneous ACBM that has the potential for damage is present in the school building, the LEA shall implement an O&M program. The LEA should take preventative measures as part of the management plan to eliminate the likelihood that the ACBM or its protective cover shall be disturbed, damaged, deteriorated or delaminated.

If any surfacing, thermal or miscellaneous ACBM that has the potential for significant damage is present in the school building, the LEA shall implement an O&M program. The LEA should take preventative measures as part of the management plan to eliminate the likelihood that the ACBM or its protective coating shall be disturbed, damaged, deteriorated or delaminated. These measures must remain in place until the material has been removed.

If the appropriate preventative measures cannot be effectively implemented, the LEA should determine whether there is a need for the functional space to be isolated and access to it restricted. The ACBM should be removed, or other acceptable abatement action taken, as soon as possible to protect human health and the environment.

Asbestos abatement actions other than small scale, short duration repairs as defined under AHERA and according to New York State requirements must be designed by persons accredited to design response actions. All asbestos abatement activities shall be performed according to federal, state and local regulations.

3.3 ADDITIONAL INSPECTION AND ASSESSMENT CONDITIONS

In addition to the information included in this report, the LEA should be aware of the following:

A. Any building materials on the exterior of the building, structural building materials, such as cinderblock, and undiscovered materials are not part of this AHERA inspection. Prior to any disturbance of the above materials, samples shall be collected and analyzed for asbestos content by a licensed inspector and an accredited laboratory. Materials defined as undiscovered shall include all suspected ACBM in concealed spaces and those not identified in the functional spaces inspected.

B. All future building materials -- mastics, adhesives, building components -- to become part of the building structure should be checked for asbestos content.

C. All materials in the AHERA survey which were assumed to contain asbestos should be re-sampled and analyzed by a licensed inspector and an accredited laboratory prior to any disturbance thereof.

D. The descriptions of homogenous material types and colors of the materials found in this survey are subjective. Notify the inspector in writing with any questions concerning these descriptions.

E. Square footages, lengths and other dimensional descriptions are approximate and should be verified prior to designing or scheduling any abatement activity.

F. All actions pursuant to AHERA and to all other applicable regulations should be kept up to date at all times within the management plan.

3.4 RE-INSPECTION FINDINGS

A. Robert E. Bell Middle School

No priority areas were found for this building. All areas which contains assumed or confirmed asbestos containing building materials should be maintained under operations and maintenance (O&M) procedures, unless otherwise noted.

4.0 OPERATIONS AND MAINTENANCE PROGRAM

O&M REQUIREMENTS FOR SCHOOL PERSONNEL AND/OR CUSTODIAL STAFF:

In case of a fiber release episode where ACBM or assumed ACBM is damaged or disturbed, the school personnel and/or custodial staff shall contact Buildings & Grounds office at (914) 238-7210 or District LEA Mr. Joseph Gramando at (914) 238-7200 ext. 1201.

O&M REQUIREMENTS FOR ASBESTOS CONTRACTOR PERFORMING O&M WORK:

The asbestos contractor performing O&M work shall adhere to the following program.

The asbestos management program has been revised for the school based on the inspection results. The revised management plan must be kept on school premises and be readily available during normal business hours without cost or other restriction, for inspection by the EPA, state representatives and the general public which includes teachers, other school personnel and their representatives, and parents. The LEA shall adhere to these as well as all other applicable regulatory requirements. The LEA shall initiate an operations and maintenance program whenever ACBM is present in a regulated building (40 CFR Part 763.91). An O&M program outlines the series of work practices required to maintain friable ACBM in good condition, to insure clean up of asbestos fibers previously released, and to prevent further release by minimizing and controlling damage to the ACBM. The elements of an O&M program include notification and labeling, employee training, worker protection and medical surveillance, cleaning and maintenance operations, fiber release episode management, periodic surveillance and record keeping.

The New York State regulations adopted in Title 12 of the Official Compilation of Codes, Rules, and Regulations, Part 56 has been adopted to require appropriate training and certification for those persons employed or contracted to handle asbestos, including the supervision of such actions. The guidelines have set forth standards and procedures that shall be followed when removal, enclosure, encapsulation, repair or disruption of asbestos or asbestos containing materials has occurred. An inspection and enforcement program within the NYSDOL has been established to address such actions. Since Industrial Code Rule 56 applies to public authorities, i.e. the LEA's, it is recommended that a full understanding of the rule be obtained prior to the implementation of the O&M program.

4.1 DEFINITIONS

Abatement: Procedures to control fiber release from asbestos material. This includes removal, encapsulation, enclosure, repair, disturbance of friable asbestos or any handling of asbestos material that may result in the release of asbestos fiber.

Accessible: When referring to ACM, the material is subject to disturbance by school building occupants or custodial or maintenance personnel in the course of their normal activities.

Asbestos Containing Material (ACM): In reference to school buildings, any material containing more than one percent asbestos.

Asbestos Containing Building Material (ACBM): Surfacing ACM, thermal insulation or miscellaneous ACM found in or on interior structural members or other parts of a building.

Asbestos Debris: Fragments of ACBM that can be identified by color, texture or composition. This may include dust if confirmed by a licensed inspector.

ACBM Condition:

Good: No visible damage or deterioration, or showing only very limited damage or deterioration.

Damaged: Physical injury or deterioration such that the internal structure of the material is inadequate, material which has delaminated such that its bond to the substrate is inadequate, or which lacks fiber cohesion or adhesion properties for any other reason. Thermal system insulation (TSI) is considered damaged when it is lacking part or all of its covering. Such damage may be shown by the separation of ACM into layers; flaking, blistering, or crumbling; water damage or stains; scrapes, mars or gouges; exposed TSI beneath its covering.

Significantly Damaged: Damage that is extensive and severe.

Action Level: An airborne concentration of asbestos of 0.1 fibers per cubic centimeter of air calculated as an 8 hour TWA (Time Weighted Average).

AHERA: The Asbestos Hazard Emergency Response Act. Signed into law on October 22, 1986 by former President Ronald Reagan. It required schools to identify asbestos containing materials in buildings, institute programs aimed at minimizing the risk of asbestos exposure in those buildings, and re-inspect those materials at least every three years.

Amosite: (Brown Asbestos) an asbestiform mineral of the amphibole group. It is the second most commonly used form of asbestos in the U.S.

Asbestos: A naturally occurring fibrous incombustible mineral, which is known to be carcinogenic when, inhaled or ingested.

Assessment: Evaluation of the physical condition and potential for damage of all friable ACBM and asbestos-containing thermal system insulation. AHERA requires classification of each

ACBM assessed into one of seven categories based on material type and damage/potential for damage.

Bulk Sample: A small portion of a suspect asbestos containing building material collected by the inspector for laboratory analysis to determine asbestos content.

Chrysotile: (White Asbestos) the only asbestos form mineral of the serpentine group. It is the most common form of asbestos used in buildings.

Contractor: A public authority or any other governmental agency or instrumentality thereof, self employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in any phase of an asbestos project.

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

Encapsulation: The treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers. Two common types of encapsulant are bridging (surface binding) and penetrating.

Enclosure: An airtight, impermeable, permanent barrier around ACBM to prevent the release of fibers.

EPA: The United States Environmental Protection Agency, Region II, Air and Hazardous Material Division. As of 1995, located at 26 Federal Plaza, New York, N.Y. 10278.

Fiber Release Episode: Any uncontrolled or unintentional disturbance of ACBM resulting in visible emissions.

Friable: Material that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. This includes previously non-friable material that after becoming damaged to the extent that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Functional Space: Room or group of rooms, or homogenous area.

High Efficiency Particulate Air (HEPA): Refers to a mechanical filtration system capable of trapping and retaining at least 99.97% of all non-dispersed particles 0.3 microns in equivalent diameter or larger.

Homogeneous Area: An area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

Inspector: Any person who performs the limited tasks involved in the survey, identification, and assessment of the condition of asbestos and asbestos material and the recording and reporting thereof, or who is involved in the collection of bulk samples of asbestos material or suspected asbestos material for laboratory analysis.

LEA: Local Education Agency, the governing authority of a school.

Management Plan: A document that describes all activities planned and undertaken to comply with all regulations, such as building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure to asbestos.

Management Planner: Any person who assesses the hazard posed by the presence of asbestos or asbestos containing material and/or who recommends appropriate response actions and a schedule for such response actions.

Miscellaneous Material: Interior building material on structural components or fixtures such as floor or ceiling tiles.

NESHAP: The National Emission Standards for Hazardous Air Pollutants, EPA rules under the Clean Air Act.

NYSDOL: The New York State Department of Labor.

OSHA: The Occupational Safety and Health Administration. As of 1990, located at 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Operations and Maintenance Program: A program of work practices to maintain ACBM in good condition, to insure clean up of asbestos fibers previously released, and to further prevent fiber release by minimizing and controlling damage to ACBM.

Periodic Surveillance: A visual examination for any change in material condition of ACBM and assumed ACBM in a building.

Personal Protective Equipment: Clothing, head gear, eye protection, footwear and gloves as required.

PLM: Polarized Light Microscopy.

Re-inspection: The re-examination, by an accredited inspector, of a building for which an original inspection was previously performed, including a re-evaluation and response action recommendations by an accredited management planner.

Removal: The taking out or stripping of ACBM from a functional space or substrate.

Repair: A corrective action using specified work practices to return damaged ACBM to an undamaged condition to prevent fiber release.

Response Action: Methods including removal, encapsulation, enclosure, repair, and operations and maintenance that protect human health and the environment from friable ACBM.

Restricted Handler: Any person performing any limited or special tasks in preparation for or ancillary to an asbestos project, such as a carpenter, electrician, plumber, or similar occupation, or any other person who may incidentally disturb asbestos during the course of any employment.

Routine Maintenance: An area, such as a boiler room or mechanical room, that is not normally frequented by students and in which maintenance employees or contract workers regularly conduct maintenance activities.

Space I.D.: Number assigned to a room or space during the original inspection.

Surfacing Material: A material that is sprayed-on, troweled-on, or otherwise applied to surfaces (e.g. acoustical plaster or fireproofing materials on structural members).

Suspect Material: Building material suspected to contain asbestos because of past practices in its manufacture and use.

Thermal System Insulation (TSI): Material applied to pipes, fittings, boilers, breeching, tanks, ducts, etc. generally to prevent heat loss or gain.

4.2 WORKER PROTECTION

A. PROTECTIVE CLOTHING AND DECONTAMINATION PROCEDURES

EPA regulation 40 CFR Part 763.91(b) serves to extend the protection provided by 40 CFR Part 763.121 (school employee protection during asbestos related projects) to any employees performing O&M and repair activities on ACM not covered by OSHA's 29 CFR 1910.1001 and 29 CFR 1926.1101 (General Industry and Construction Standards for Asbestos). These standards shall be adhered to where applicable during all O&M operations involving the disturbance of ACBM.

The employees of the LEA who clean up, repair or otherwise disturb ACBM are required to wear protective clothing and respirators. The protective clothing shall consist of full body disposable coveralls (Tyvek or equivalent). The worker shall remove all street clothes, undergarments, jewelry, watches, etc. before putting on protective clothing. A respirator shall be put on under the hood or head covering and will be the last item removed during decontamination.

Upon completion of the work, workers shall HEPA vacuum and wet wipe the outside of the protective clothing, including the respirator. The protective coveralls shall be removed and placed in 6 mil plastic bags and discarded as asbestos waste. The worker shall shower after removing protective clothing. Workers shall not remove the respirator until they are in the shower and have thoroughly wet their hair and body and washed the exterior of the respirator. Respirator cartridges shall be removed and disposed of as asbestos waste. Protective boots or shoes shall be HEPA vacuumed and wet wiped during decontamination and stored in a 6 mil polyethylene disposable bag and used only for asbestos work. A shower filtration system to filter asbestos fibers from the water shall be used and shall conform with all applicable regulations. Portable shower units are readily available, inexpensive and easy to install and transport.

If showering facilities are not available and if allowable by federal, state and local regulations, the workers shall proceed to remove all street clothing, as described above, and wear two sets of protective clothing. Gloves shall be worn in addition to the respirator. The workers shall duct tape all openings or potential openings to keep out asbestos fibers. Upon completion of the work, workers shall HEPA vacuum and wet wipe the outer layer of coveralls, including the respirator. Upon removal, the outer layer of protective coveralls shall be placed in 6 mil plastic bags and discarded as asbestos waste. With the respirator still on and wearing the second layer, the worker shall proceed to the nearest shower. The workers shall then remove the coveralls and take a complete shower or wash the outside of the respirator, hands, face and arms. The coveralls and respirator cartridges shall be disposed of as asbestos waste. The workers may then re-dress in street clothing.

B. MEDICAL MONITORING PROGRAM

EPA's Worker Protection Rule, 40 CFR Part 763.121, has been set forth to apply to maintenance staff at schools whose activities include operations and maintenance on or around ACBM. Medical monitoring has been specified where ACM exposure is likely to exceed the OSHA Permissible Exposure Level of 0.1 fibers per cubic centimeter of air (f/cc) calculated as an 8 hour Time

Weighted Average (TWA) during the course of work. The program must be provided at the cost of the LEA and consist of the following elements:

i. Preplacement Examination [40 CFR Part 763.121(f)(2)]
To be provided within 30 days of employment and shall include medical history, chest x-ray, and pulmonary function test (PFT).

ii. Annual Examination [40 CFR Part 763.121(j)(3)]
To include an update of the medical history, chest x-ray, (at minimum every five years 29 CFR 1910.1001, Table 2) and PFT.

iii. Termination Examination [40 CFR Part 673.121(j)(4)]
To be provided within 30 days pre- or post- termination date and will include medical history, chest x-ray and PFT.

iv. Medical Records [40 CFR Part 763.121(j)(6)]
Records of employees shall be maintained complete and accurate for at least 20 years. Medical examination records shall be made available for inspection and copying to the EPA, Assistant Secretary of Labor for Occupational Safety and Health, the Director of National Institute for Occupational Safety and Health (NIOSH) and their physicians and medical consultants, and upon the request of an employee or former employee to the physician.

The physician who conducts the medical examination shall provide the required information to the employer along with any other medical information related to occupational exposure to asbestos fibers as per the regulatory requirements.

4.3 RESPIRATORY PROTECTION PROGRAM

Information on the use of respiratory protection as contained in the EPA/NIOSH "Guide to Respiratory Protection for the Asbestos Abatement Industry" (September 1986, EPA 560/OPTS-86-001), available from TSCA Assistance office (T5-799), Office of Toxic Substances, EPA rm E-543, 401 M Street, S.W., Washington DC, 20460.

Respirators shall be provided to all workers performing asbestos related activities. The respirator will be appropriately fit-tested to ensure that it functions effectively for that individual. Each respirator will be supplied with disposable cartridges approved for asbestos dust by NIOSH and will be worn at all times during abatement activities.

A physician must determine that workers are physically fit to wear the respirator while working. A physical exam should be performed and should include complete work history, pulmonary function exam with full chest x-ray in addition to full physical. This procedure is repeated annually thereafter and also within 30 days of an employee's termination. The x-rays administered during the course of this medical exam shall be interpreted by a NIOSH certified B-Reader.

Respirators used shall be approved jointly by NIOSH and Mine Safety and Health Administration (MSHA) as well as all other federal, state and local agencies governing this type of work. All filters

shall be purple or magenta colored canisters with HEPA filers. Respirator filters and any replacement parts must be purchased from the manufacturer. At no time can parts from different respirators be interchanged. The instructions and recommendations of the respirator manufacturer shall be followed concerning decontamination, removal and filter replacement.

Respirators should be inspected before and after each use. Specific items to check during these inspections will depend on the type and manufacturer of the respirator (see owners instruction booklet for proper procedures). Examples of what to inspect include checking the silicone rubber face pieces, straps, flexible hose, intake and exhaust valves, etc.

Each respirator should be cleaned and sanitized after each use. A mild disinfectant soap and water may be used or any other type of product designed for respirator cleaning. After cleaning the respirator should be hung and allowed to air dry before being used again. Respirators should not be stored in a manner that will disfigure or damage the unit. Storage of the unit near corrosive chemicals or strong sunlight will accelerate the deterioration of the face piece.

Each worker who wears a respirator shall be fit tested to ensure a tight seal where the face comes in contact with the mask. Workers who have beards or excessive facial hair will not be able to carry out asbestos related work. One example of a fit test is the qualitative check of the respirator to face seal using a chemical smoke irritant, saccharin or banana oil every six months for each brand and size respirator an employee shall wear. This testing should be carried out by a qualified health/safety professional.

4.4 WORKER TRAINING

The LEA must provide awareness training of at least two hours to maintenance engineers and custodial workers who are employed by the LEA and work in buildings that contain ACBM. This awareness training is required whether or not these individuals work with ACBM. New employees shall be trained within 60 days after they begin work. The training shall include, at a minimum, information about asbestos and its different uses and forms, background concerning health effects associated with asbestos exposure, the locations of ACBM as identified throughout each school building, the recognition of damage, deterioration and delamination which is related to exposure potentials, the name and phone number of the individual who has been designated as the LEA Asbestos Coordinator, and the location of the management plan.

The LEA is also required to provide in depth training to those employees who conduct any activity which will result in the disturbance of ACBM. The training shall include the previously described two hour awareness as well as 14 additional hours. The additional 14 hours shall include, at minimum, descriptions in the proper methods of handling ACBM; proper use of protective equipment such as respirators, disposable clothing, HEPA vacuums, etc.; complete description of the requirements of AHERA and other federal, state and local regulations; and hands-on training in the use of personal, protective equipment and work procedures.

All forms of training provided shall emphasize the necessity to not disturb ACBM during routine maintenance activities. Employees shall be instructed at a minimum to follow these standards:

i. Avoid performing any activities on ACM that may cause abrasion or physical deterioration of the material. This includes sanding, nailing, drilling, cutting or otherwise damaging the material.

ii. Avoid damaging the ACM during maintenance activities **NOT** directly involving the ACM such as installing drapes, carpets, moving furniture, etc.

iii. Always use a HEPA vacuum and the wet method to clean asbestos dust or debris.

NEVER USE A REGULAR VACUUM OR DRY METHOD.

iv. Avoid any activity that may inadvertently release asbestos fibers into the air such as removing contaminated or potentially contaminated ventilation filters, drying and/or shaking the filters, or removing suspended ceiling tiles below ACM without taking the proper precautions and using the proper personal protective equipment.

4.5 PERSONAL AND AREA AIR MONITORING

A requirement of 40 CFR Part 763.91 is that the LEA ascertain, through monitoring or historical data, the airborne concentration of asbestos fibers during all maintenance and repair activities involving ACBM or assumed ACBM. Coverage of EPA's worker protection rule under 40 CFR Part 763.121 is directed to maintenance staff at schools who perform O&M activities.

OSHA has established and EPA has adopted a Permissible Exposure Limit (PEL) of 0.1 f/cc over an 8 hour time weighted average (TWA) for asbestos exposure. As previously stated, once this level is met or exceeded, a number of required work practices must be implemented, including air monitoring, regulated work areas, engineering and work practice controls, respiratory protection, protective clothing, hygiene facilities and practices, training, medical surveillance and record keeping.

As a means for compliance to those regulations, 8 hour TWA air sampling shall be conducted during any small-scale, short duration maintenance activities involving ACM. It is recommended that air monitoring be performed as follows:

i. Personal samples should be collected at the breathing zone of employee(s) performing a particular asbestos related activity.

ii. It is also recommended that area samples be collected in the vicinity of the maintenance activity to determine the expected level of air contamination in the surrounding areas as a result of the activity.

All air monitoring will be done in accordance with OSHA (29 CFR 1910.1001 and 1926.1101) and EPA's 40 CFR Part 763.121. Sample collection and analysis shall be conducted according to NIOSH methodology. The samples will be taken to determine the 8 hour time weighted average concentrations and ceiling concentrations of asbestos fibers.

Results of all analysis will be posted in the buildings maintenance office and in the office of the LEA's asbestos coordinator. The air analysis report shall be included in the building's management plan as part of the permanent record.

In addition to the above, it should be noted that in response to a U.S. Court of Appeals order, OSHA issued a short term permissible exposure limit designed to protect workers from "bursts" of exposure to asbestos. The limit, referred to as the Excursion Limit (EL), was announced on September 14, 1988 (53 FR 35610) and went into effect on October 14, 1988. This limit amended OSHA's asbestos regulations for general industry and construction industry. The EL limits the exposure of unprotected workers to one fiber per cubic centimeter (f/cc) averaged over a period of 30 minutes. It is advisable that a copy of this ruling be obtained and added to the permanent record.

4.6 CLEANING PROCEDURES

Cleaning procedures described herein describe semiannual cleaning required under AHERA in any area where damaged ACM and/or asbestos containing debris has been identified. All cleaning must conform with requirements set forth in NYS Industrial Code Rule 56.

No initial cleaning records were identified by the AHERA inspector during the review of the original management plan. Initial cleaning requirements under 40 CFR Part 763.91(c) must be met and the appropriate records kept with the management plan.

A. SURFACING MATERIALS

ACM that has been sprayed or troweled onto ceilings and walls are often the main source of airborne asbestos fibers in a building. Areas covered by surfacing ACM tend to be large and, if the material is friable, fibers are gradually released as it ages. Spray any debris found near surfacing ACM with amended water and place the debris in 6 mil polyethylene bags using a wet cloth and pan. Rinse the pan into the bag. Report the presence of debris immediately to the LEA. HEPA vacuum all carpets; no normal vacuums are allowed. Dispose of all debris, filters, mop heads, and cloths in 6 mil polyethylene bags according to EPA regulations for disposal of asbestos waste.

B. THERMAL SYSTEM INSULATION

Cleaning procedures shall be performed in an expedient manner and thereafter on a semiannual basis for all areas where damaged thermal ACM has been located within the building. Once this damage has been abated, the asbestos coordinator shall ensure that the material remains intact. If further deterioration or delamination exists, the findings can be documented during the periodic surveillance and the appropriate response actions shall then be implemented.

C. MISCELLANEOUS MATERIALS

Miscellaneous ACM such as floor tiles, transite board and asbestos containing cement are non-friable forms of asbestos. The potential for fiber release episodes are therefore relatively low.

Because of their low friability, a cleaning program is not suggested for these materials unless they have been damaged. For all other miscellaneous materials the cleaning procedures of surfacing materials should be followed.

4.7 OPERATIONS, MAINTENANCE AND REPAIR PROCEDURES

The AHERA regulation defines those activities which LEA employees are allowed to conduct as "small scale, short duration." The definition is ambiguous but can be interpreted as: a) removal of small quantities of ACBM only if required in the performance of other maintenance and not intended as asbestos abatement; b) removal of thermal insulation in amounts not greater than that which can be contained in a single glove bag; and c) minor patching and repair to surfacing or thermal insulation which does not include removal. New York State Industrial Code Rule 56 clearly defines asbestos related activities, how they to be performed, and the worker qualifications required to perform them. The requirements under this regulation represent the most stringent applicable regulations. Therefore, this regulation shall be adhered to strictly during applicable operations.

A. ROUTINE MAINTENANCE

All maintenance and renovation activities must be approved by the LEA to ensure that ACBM is not inadvertently disturbed. This includes work that is performed by in-house personnel, such as maintenance of mechanical systems, as well as by outside vendors, such as telephone, computer or HVAC contractors. All outside contractors/short-term workers who may come in contact with ACM must check the Management Plan for information regarding the locations of known, suspected & assumed ACBM.

Routine activities which directly impact ACBM are prohibited. These include hanging, taping or tacking objects from ceiling acoustical plaster; storing tools and materials near or against thermal insulation; and sanding or drilling asbestos floor tiles.

Routine activities which may disturb ACBM must be strictly controlled to prevent fiber release. Changing light bulbs in an acoustical plaster ceiling, working on equipment near surfacing or thermal insulation, or replacing floor tiles should be done during off hours by trained staff with appropriate equipment.

All maintenance activities which will disturb ACBM, such as replacing insulation valves or cleaning out insulated flue or boiler equipment, must be performed under the procedures described in federal, state and local regulations. **DRY SWEEPING ACBM DEBRIS IS STRICTLY PROHIBITED.**

B. PERIODIC SURVEILLANCE

At least once every six months after implementing the management plan, the LEA shall conduct periodic surveillance in each functional space that contains ACBM. Inspections of ACBM must be performed as part of the on-going O&M program in order to comply with AHERA. Each person performing periodic surveillance shall:

i. Visually inspect all areas identified in the management as ACBM or assumed ACBM.

ii. Record the date of the surveillance, the inspector's name and any changes in the condition of the ACBM, i.e. water damage, debris, changes in the patterns of use, air erosion or delamination. This information will then be incorporated into AHERA 3 Year Re-Inspection Form, which is located in Appendix 4.

iii. Maintenance personnel should inform the asbestos coordinator when debris has been cleaned up. The cleaning procedures shall be conducted according to section 7.6 of this report and all other applicable regulations.

The maintenance staff should make routine visual inspections of all surfacing materials, thermal insulation and miscellaneous materials. If the inspections reveal a change in the condition of the ACBM the staff shall report their findings to the LEA. The following techniques shall be used:

1. Periodic Surveillance for Surfacing Materials:

- All material is free from any water damage, discoloration or contact damage.
- Inspect vents for signs of air erosion.
- Check horizontal surfaces for visible debris.

2. Periodic Surveillance for Thermal System Materials:

- All wrapping, lagging and protective jackets are intact.
- All material is free from punctures, rips, tears, gashes, gouges and/or water damage. Seams and exposed ends of TSI sections are particularly susceptible to physical damage and should be referred to within the surveillance report.
- Any debris from damaged TSI must be picked up immediately following procedures identified in section 7.6 of this report and all applicable regulations.

3. Periodic Surveillance for Miscellaneous Materials:

- All material is free from contact damage, discoloration or water damage.
- Check horizontal surfaces for visible debris.

Once every three years, or until all of the ACBM is removed, an AHERA accredited inspector must re-inspect the school for the presence of ACBM.

The periodic surveillance and re-inspection shall follow the schedule outlined below:

1st	_	January 2023	2nd	_	July 2023
3rd	_	January 2024	4th	_	July 2024
5th	_	January 2025	Re-inspection	_	July 2025

C. EMERGENCY EVENTS

Minor Fiber Release Episode

The EPA defines a minor fiber release episode as visible emissions or debris from disturbed or damaged ACM which dislodges less than three square feet of surfacing ACM or three linear feet of thermal insulation. When a minor fiber release episode occurs, the asbestos coordinator shall direct work as follows:

1. Restrict access and isolate area during the cleaning process.

2. Apply amended water to the debris, mist air in the area and remove and dispose of the ACM according to federal, state and local regulations.

3. Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos fibers.

4. Remove, repair, encapsulate or enclose the ACM fiber release source as per federal, state and local regulations.

5. Dispose of all asbestos waste according to EPA and other applicable regulations.

6. Document the fiber release episode as part of the management plan.

Major Fiber Release Episode

The EPA defines a major fiber release episode as visible emissions or debris from disturbed or damaged ACM which dislodges greater than three square feet of surfacing ACM or three linear feet of thermal ACM. When a major fiber release episode occurs, the asbestos coordinator shall:

1. Restrict and isolate the affected areas and post warning signs.

2. Use trained and protected workers to lock out HVAC systems to the area.

3. Notify the appropriate regulatory agency as required under NESHAPS.

4. Execute appropriate response actions with accredited abatement designers and contractors.

5. Document the fiber release episode as part of the management plan.

D. REPAIR PROCEDURES

Repair Procedures for Surfacing ACM

All personnel who disturb ACBM must be provided with the proper protective equipment. This shall include, but is not limited to, disposable protective overalls, HEPA vacuums, respirators, high quality duct tape, 6 mil fire retardant polyethylene sheeting, glovebags, spray adhesive, "DANGER ASBESTOS" signs, surfactants, encapsulants, asbestos repair materials, and other appropriate tools.

To repair damaged surfacing materials, follow these procedures:

1. Repair work must be performed by qualified, trained individuals according to all federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. "Caution hazard" signs shall be posted at all work entrances and along perimeter of the work site. If necessary, rope off the area with barrier tape.

4. All vents, lighting fixtures, desks and equipment in the proximity of the work area shall be covered with 6 mil fire retardant polyethylene sheeting.

5. Lock out all ventilation heating and cooling systems to avoid fiber release to areas of the building which are unaffected.

6. Mist air at the location where the repair will be performed.

7. Pick up and dispose of any debris found on surfaces.

8. Wet wipe and HEPA vacuum all horizontal and vertical surfaces potentially contaminated with asbestos fibers. Take down two layers of 6 mil polyethylene sheeting on horizontal and vertical surfaces in the area.

9. After all affected surfaces are free from asbestos debris, lay down two (2) layers of 6 mil fire retardant polyethylene sheeting on horizontal and vertical surfaces in the area.

10. Gently mist the damaged material with amended water and carefully remove loose pieces of ACM.

11. If necessary, fill the damaged areas with a non-asbestos containing plaster or other patch material that will adhere to both the substrate and the adjoining ACM.

12. Encapsulate using a low pressure sprayer.

13. When the repair is complete, remove polyethylene sheeting and dispose of as asbestos contaminated waste.

14. Re-clean the area using wet wiping and HEPA vacuuming techniques.

15. Dispose of cloths, respirator filter cartridges, coveralls, etc. as asbestos contaminated waste.

16. Record activities as part of the management plan and repeat periodic surveillance and cleaning as part of the on going O&M program.

Patch and Repair Techniques for Thermal System Insulation

The following procedures shall be executed:

1. Repair work shall be performed by individuals qualified and trained according to federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. "Caution hazard" signs shall be posted at all work entrances and along perimeter of the work site. If necessary, rope off the area with barrier tape.

4. All vents, lighting fixtures, desks and equipment in the proximity of the work area shall be covered with 6 mil fire retardant polyethylene sheeting.

5. Lock out all ventilation heating and cooling systems to avoid fiber release to areas of the building which are unaffected.

6. Wet wipe and HEPA vacuum all surfaces in the area potentially contaminated with asbestos fibers.

7. Horizontal and vertical surfaces in the vicinity shall be covered with two layers of 6 mil fire retardant polyethylene sheeting.

8. Gently mist the damaged area with amended water.

9. Remove all loose and damaged debris.

10. HEPA vacuum the substrate and surface area.

11. Repair surfaces with an appropriate patching material.

12. Encapsulate the repaired area with an approved encapsulant.

13. Apply fiberglass cloth to wet encapsulant by wrapping around the surface, covering twice with overlapping seams. Smooth out all areas of cloth.

14. Re-encapsulate fiberglass cloth. Use thick, even coats.

15. Wet wipe or HEPA vacuum affected areas.

16. Double bag and dispose of asbestos waste and all debris contaminated plastic, cloths, respirator filter cartridges and disposable clothing.

17. Record all abatement/patch and repair activities as part of the management plan.

E. MINOR THERMAL INSULATION REMOVAL BY GLOVEBAG METHODS

The glovebag method is for removal of damaged insulation on pipes and pipe fittings. A minimum of two people is required to perform a glovebag removal. Repair work shall be performed by qualified individuals, trained according to all federal, state and local regulations. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

1. This method shall be optional only in areas not scheduled for gross removal operations.

2. Glovebags may only be used on piping and after approval from the asbestos coordinator.

3. The workers shall be required to protect equipment by cleaning and wrapping it with polyethylene sheeting, tape and/or adhesive.

4. Workers shall clean and protect as necessary all floors and walls within the work area with 6 mil fire retardant polyethylene sheeting, tape and/or adhesives. As a minimum, extend polyethylene one foot horizontally in all directions for each foot of vertical height from the floor to the material.

5. If fiber levels found on personal samples during glovebag removal exceed 0.01 f/cc and methods to reduce the levels prove futile, the workers shall remove the insulation according to more stringent requirements such as NYS Industrial Code Rule 56 and other applicable guidelines.

6. Using approved glovebags in strict accordance with applicable regulations and the manufacturer's instructions, workers in full protective body clothing and appropriate respirators shall begin removal of pipe insulation as per the following minimum procedures. In case of conflict the more stringent provisions of the applicable regulations shall apply.

7. Cut the sides of the glovebag to fit the size of the pipe to be worked on and insert the needed tools into the attached pocket.

8. Seal the glovebag by folding the open edges, then staple and tape. Provide any additional precautions necessary to support the weight of the debris.

9. Tightly seal the edges of the glovebag around the working area with tape. Slice open the side port to allow entry of the wetting tube and HEPA vacuum hose. Insert the nozzle from the portable sprayer. Seal around with tape and thoroughly wet the area to be removed. Insert the vacuum hose and seal accordingly.

10. Before removal work procedures the glovebag must pass a smoke test as follows:

    i. Aspirate the contents of a smoke tube through the water port access of the bag.
    ii. After twist sealing the access port the bag shall be squeezed gently and checked for any leakage points so they can be taped air tight.

iii. Replace the spray nozzle in the bag and seal with tape.

11. Upon approval of the glovebag attachment, insert arms into the armholes and gloves and wet the material to be removed. Proceed to remove the elbow, valve fitting or pipe. At locations where insulation rests directly on pipe hangers or supports, the worker shall re-support the pipe by shimming with wood blocks or other suitable materials. Continue wetting the material as required. Once all insulation materials have been removed, thoroughly wet the pipe and remaining insulation and wash down the inside of the glovebag.

12. Scrub or brush any visible, remaining insulation material from the pipe or fitting. Rinse and wet pipe again. Seal the exposed insulation edges with the proper encapsulant. When the job is complete, remove the spray nozzle and turn on the HEPA vacuum to remove air from the bag.

13. When the air is removed from the bag, squeeze the bag tightly as close to the top as possible. Twist and tape to keep the asbestos material safely at the bottom of the bag. Turn off the HEPA vacuum. Remove the hose from the side port and seal the side port with tape.

14. Place a 6 mil plastic bag around the glovebag. Cut and remove the glovebag from the pipe. Twist and seal. Place it into another plastic bag and seal. Move bags to holding area or the disposal storage area.

15. Mist surface of protective polyethylene and carefully fold inward. Proceed to HEPA vacuum the work area for any residual materials. Reseal the exposed edges and piping with the proper encapsulant if needed.

16. The testing shall be in accordance to AHERA and other federal, state and local regulations.

17. Reestablish objects moved to temporary locations in the course of work to their proper positions.

F. REPAIR OF NONFRIABLE MISCELLANEOUS ASBESTOS CONTAINING MATERIALS

If a situation such as a damaged floor tile exists, the best possible response action is replacement. If this cannot be done, the following is recommended:

1. Repair work must be performed by qualified individuals, trained according to all federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. Post hazard signs and restrict access to the area.

4. Prohibit access of unauthorized personnel.

5. Clean up debris from surfaces via wet wipe/HEPA vacuum methods. No drilling, cutting with power tools or sanding is permitted.

6. Cut all floor tiles with a utility knife.

7. Fill all holes and cracks with an equivalent non-ACM and/or plaster. Apply a thick coating of bridging encapsulant at full strength. This form of encapsulant differs from a penetrating encapsulant in that it forms a surface layer of "skin" over non-friable, impenetrable forms of asbestos. Allow to dry and apply a second coat.

8. Record activities as part of the management plan and repeat periodic cleaning and surveillance as part of the on-going O&M program.

4.8 WASTE DISPOSAL

All ACM waste shall be double bagged in 6 mil polyethylene plastic bags. These bags shall be preprinted as per OSHA and Federal DOT requirements to show they contain ACM. Asbestos waste shall be kept in a secured and controlled location such as a routine and maintenance area of the facility. Filled bags of waste are carried to this area and placed in sealable metal or fiber 55 gallon drums, labeled as per applicable regulations. When the drums are full, they shall be sealed, labeled and transported to a landfill site approved to accept ACM waste by EPA and all other federal, state and local requirements.

The waste containers shall be transported to the landfill site in a covered, lockable vehicle. All transported containers shall be accompanied by a proper chain of custody (manifest) form that details the origin of the material, date and quantities of transport, types of containers and their destinations. If transported by a third party hauler, information on the form is signed at each transfer point and, after final transport to the landfill site, a copy of the form shall be maintained in the management plan.

4.9 WARNING LABELS

Warning labels shall be attached immediately adjacent to any friable and non-friable ACBM located in routine maintenance areas as per 40 CFR Part 763.95. The labels must be of a size, print and color easily visible to persons entering an area containing ACBM. The labels will read:

CAUTION ASBESTOS, HAZARDOUS
DO NOT DISTURB
WITHOUT PROPER TRAINING AND EQUIPMENT

Warning labels and signs must remain in place until the asbestos containing material(s) is/are removed.

4.10 NOTIFICATIONS OF AFFECTED PARTIES

AHERA requires that steps be taken to inform workers and building occupants, or their legal guardians, about inspections, re-inspections, response actions, and post-response action activities, including periodic re-inspection and surveillance activities which are planned or in progress. At a minimum, these notifications must occur on a yearly basis following the initial notification. Notifications of the various parties can be accomplished in two ways:

1. Distributing notices; and
2. Holding awareness and/or informational seminars.

The distribution of notices is an effective means of alerting occupants about the presence of asbestos. Memorandums or letters tailored to specific parties provide excellent documentation along with verification that the notification was furnished. The AHERA Management Plan must be made available for review by the public, including but not limited to parents, teachers and other school personnel and their representatives, without cost or restriction. The school, however, may charge a reasonable fee to make copies.

Awareness and/or information seminars can follow written notification. These serve to expand upon the information given in the written form. They also serve as a question and answer period for anyone with questions regarding asbestos. Copies of notification memos, attendance lists at any awareness seminars, hand-outs provided, and the name of the person or persons providing the seminars should be filed.

4.11 SUGGESTED OPERATIONS AND MAINTENANCE EQUIPMENT

1. Disposable coveralls
2. Rubber or latex gloves
3. Half face, dual cartridge negative pressure respirators with NIOSH and MSHA approved cartridges
4. Safety goggles
5. Surfactant
6. Misting spray bottle
7. Misting spray tank
8. Dust mop/broom
9. Polyethylene sheeting (6 mil)
10. Asbestos disposal bags (6 mil)
11. HEPA vacuum with attachments
12. Duct tape
13. Hand tools
14. Warning signs and labels
15. Scrim cloth and/or foil tape for pipe wrap
16. Encapsulant bridging and penetrating
17. Smoke tube kit
18. Glovebag

4.12 DOCUMENTATION AND RECORD KEEPING

As part of the management plan, the LEA must maintain all records required by AHERA in a central file at the administrators office, which is currently the district office, located at 66 Roaring Brook Road, Chappaqua, NY 10514, as well as in individual buildings as per 40 CFR 763.94. These records shall include documentation of all ACBM locations, conditions, response actions and activities in addition to training, medical records and personnel updates.

A list of items to be included in this file is:

1. All abatement activity and related documents and test results until (1) the entire homogeneous area has been removed and (2) for at least three years after the next re-inspection. This information must be comprehensive and complete.

2. For each response action or preventive maintenance procedure: (a) detailed description of work, (b) methods used, (c) location of action, (d) reasons for selecting action, (e) start and completion dates, (f) names and addresses of all contractors used, their state of accreditation and accreditation numbers, (g) name and location or storage or disposal site for ACBM which was removed, (h) names and signatures of persons collecting air samples, (i) locations where air samples were collected, (j) date of sample collection, (k) name/address of lab analyzing the samples, (l) date of analysis, (m) results of analysis, (n) method of analysis, (o) name/signature of analyst, and (p) statement that the lab meets requirements.

3. Documentation of the LEA's employee training program with: (a) an updated list of personnel involved, (b) date and location of the training, and (c) number of training hours completed.

4. Periodic surveillance results including: (a) the inspector's name, (b) date of the surveillance, (c) findings of the surveillance, and (d) remedial action taken, if any.

5. For each O&M procedure: (a) the person's name who did the O&M, (b) start and c-completion dates, (c) locations of the activity, (d) description of the activity/ preventative measures, and (e) ACBM storage or disposal site.

6. For each fiber release episode under 40 CFR Part 763.91(f): (a) date and location of the episode, (b) method of repair, (c) preventative measure or response action taken, (d) the name of each individual involved and their activity and, if applicable, (e) the storage or disposal site for the ACM removed.

7. For each major asbestos activity performed: (a) name, signature, State of accreditation, and accreditation number of each person performing the activity, (b) locations of the activity, (c) description of the activity/preventative measure, and, if applicable, (d) the storage or disposal site for the ACM removed.

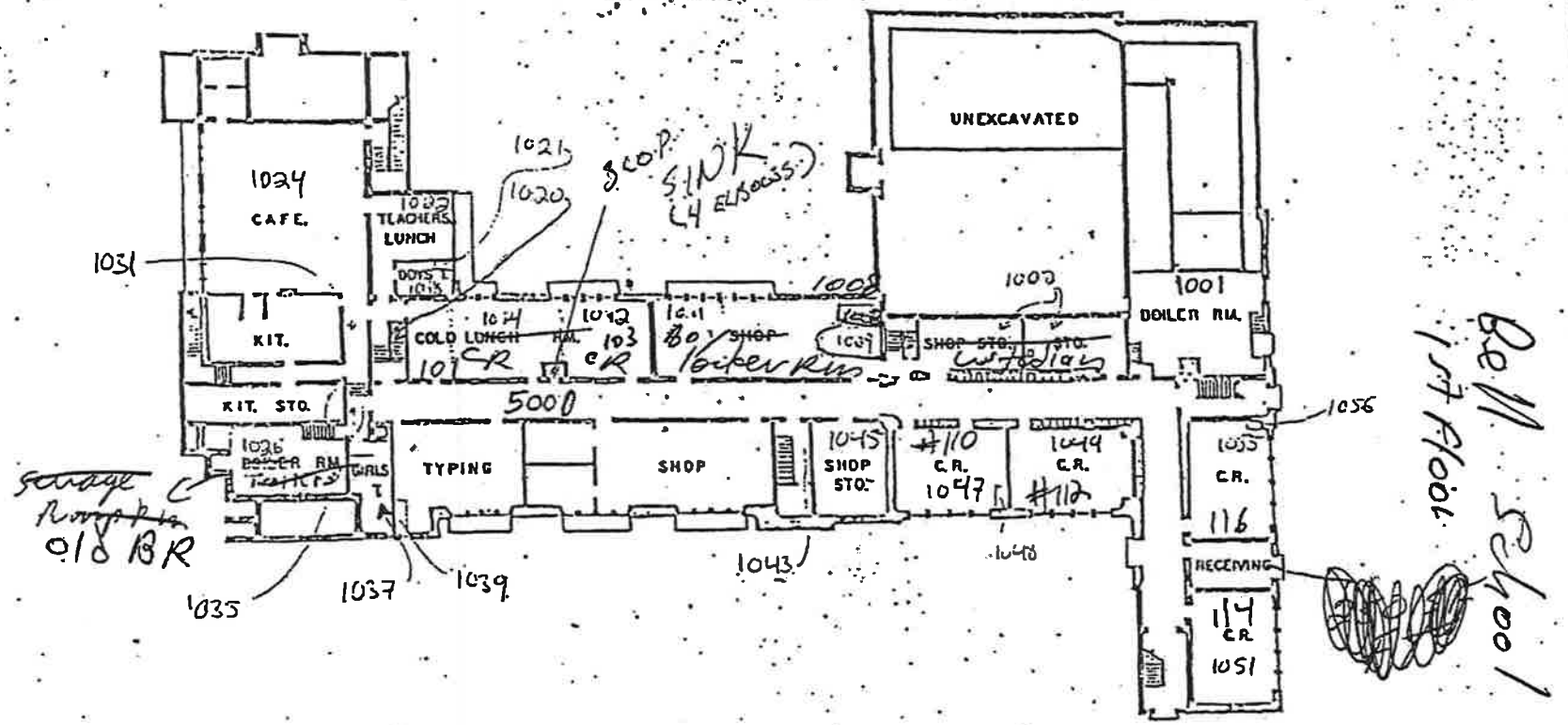
5.0 LEA DESIGNATED PERSON

As stated in the AHERA regulations, each LEA must designate a competent person to be responsible for implementing the Management Plan for each school. . For the Chappaqua Central School District, the designated person as of the start of this inspection is:

Joseph Gramando
Buildings and Grounds Office
66 Roaring Brook Road
Chappaqua, NY 10514

APPENDIX 1:

SITE PLANS



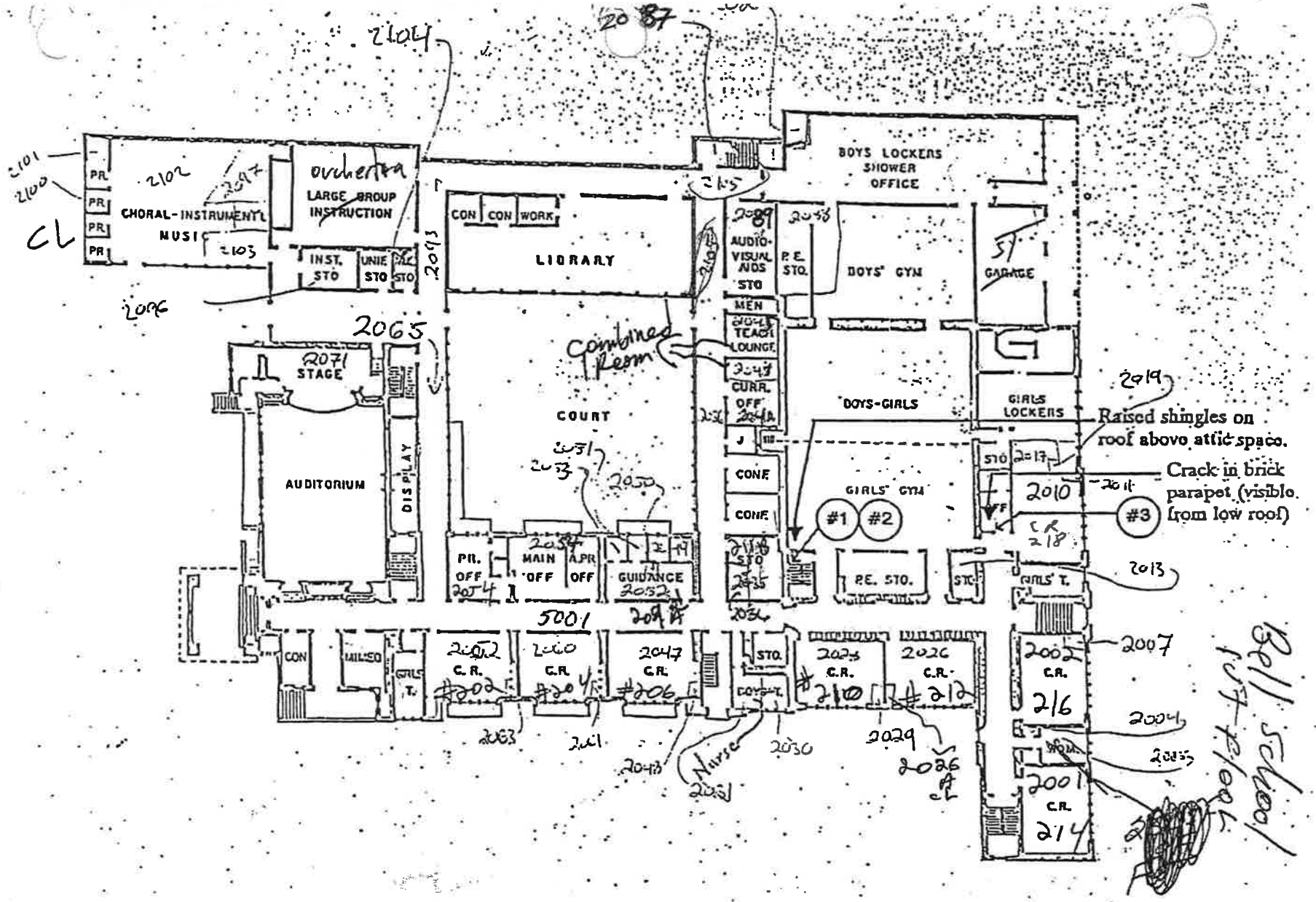
ROBERT E BELL SCHOOL

FIRST FLOOR PLAN

ENLARGED FOR 1050 PUPILS

scale 0 25 50 75

WOOD, MILLS & SMITH — ARCHITECTS



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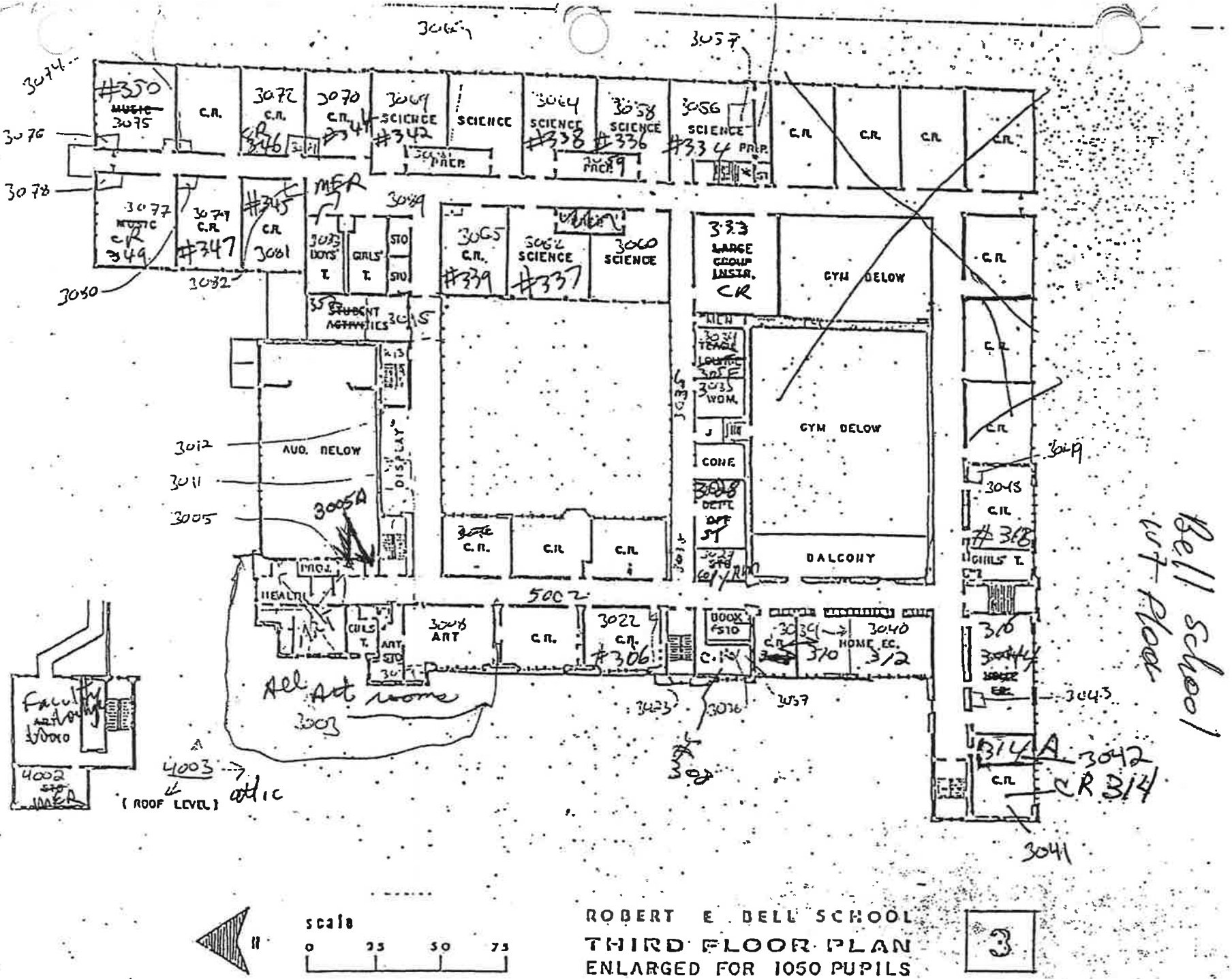
ROBERT E BELL SCHOOL

SECOND FLOOR PLAN

ENLARGED FOR 1050 PUPILS

2

WOOD, WILLIS & SMITH — ARCHITECTS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C.R.
3072 C.R.
3070 C.R. #344
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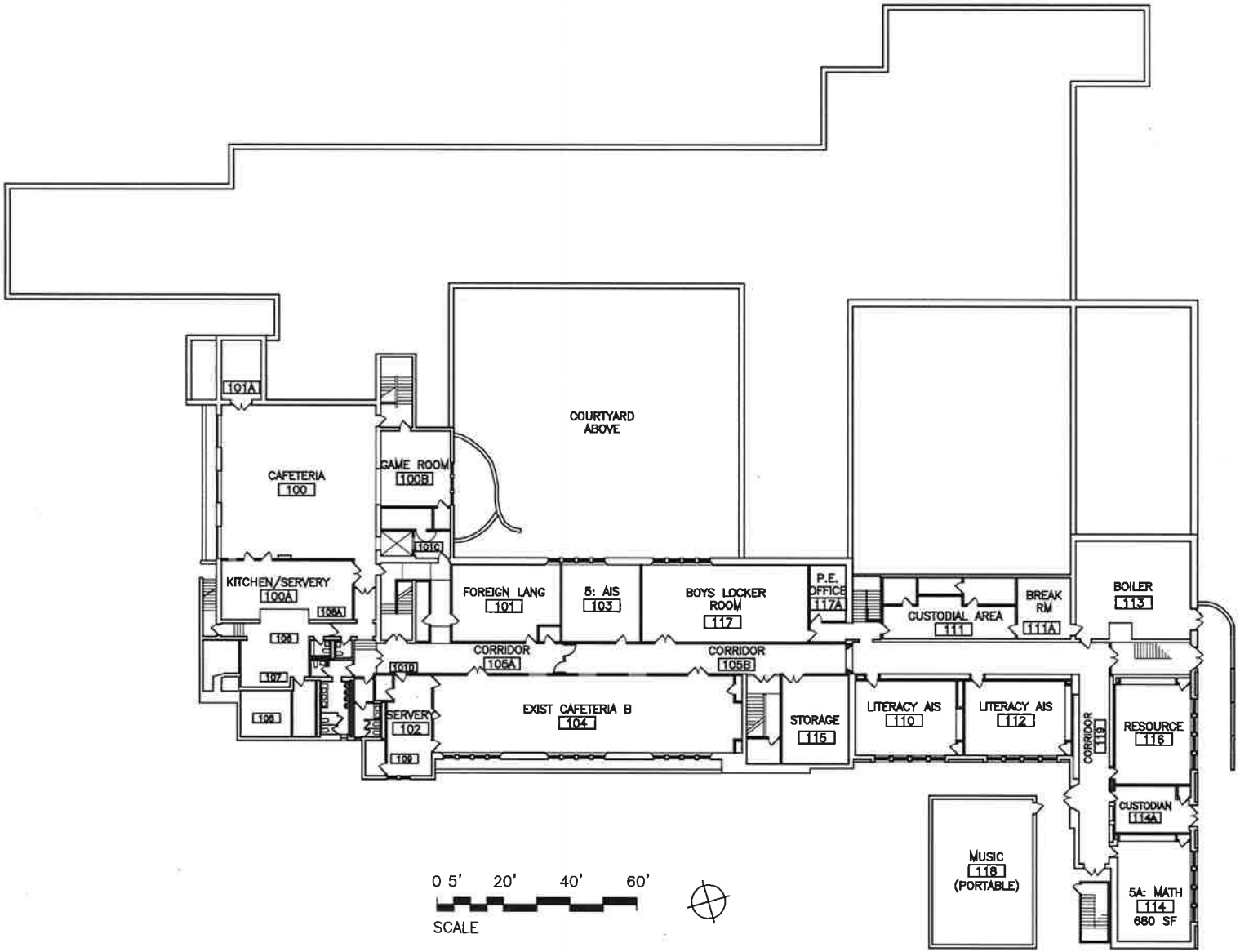
SCIENCE
3064 SCIENCE #338
3058 SCIENCE #336
3056 SCIENCE #334 PREP.
C.R.
C.R.
C.R.
C.R.
3074
3076
3078
3077 MUSIC CR 349
3079 C.R. #347
#345 C.R. 3081
MER
3082
3080
3083 BOYS' T.
GIRLS' T.
STO
STO
3065 C.R. #339
3062 SCIENCE #337
3060 SCIENCE
3039
3033 LARGE GROUP INSTR. CR
GYM BELOW
C.R.
3034 TEACH. LOUNGE
3035 WOM.
CONF.
3008 DEPT. OFF.
GYM BELOW
C.R.
3049
C.R. #348
GIRLS' T.
3012
3011
3005
AUD. BELOW
DISPLAY
3005A
3035
3015 STUDENT ACTIVITIES
C.R.
C.R.
C.R.
BALCONY
3001
HEALTH
5002
GIRLS' T.
ART
3008 ART
C.R.
3022 C.R. #306
BOOK STO
3039
3040 HOME EC.
310
3044
EL.
3043
3042
CR 314
3041
Faculty Lounge 3/0010
4002 STO
WATER
4003
ROOF LEVEL
attic
All Art room
3003
3023
3036
3037
3038
3042
scale
0 25 50 75
ROBERT E. BELL SCHOOL
THIRD FLOOR PLAN
ENLARGED FOR 1050 PUPILS
3
Bell School
1st Floor

KG&D ARCHITECTS PC

FIRST FLOOR PLAN

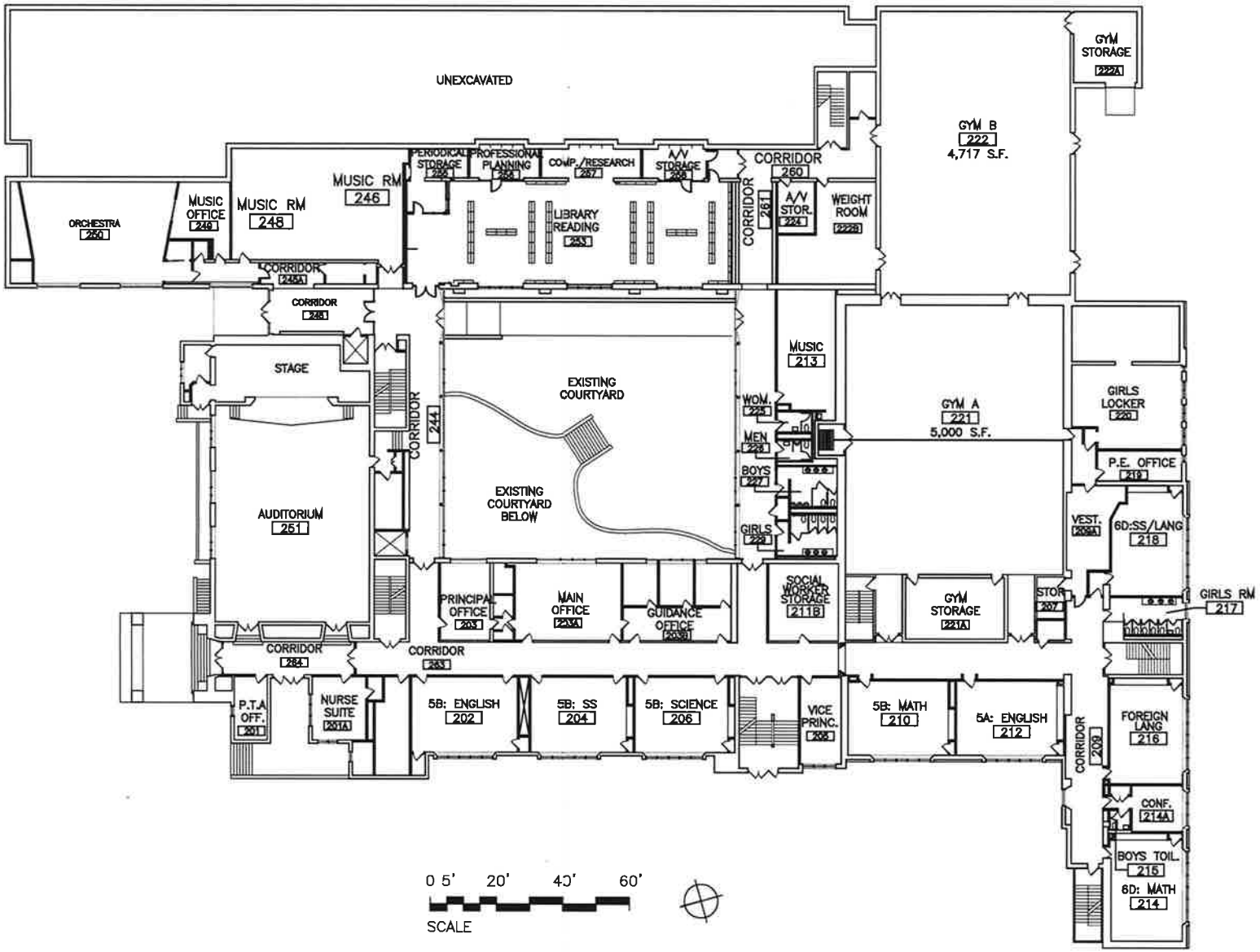
BELL MIDDLE SCHOOL
CHAPPAQUA NEW YORK



KG&D ARCHITECTS PC

SECOND FLOOR PLAN

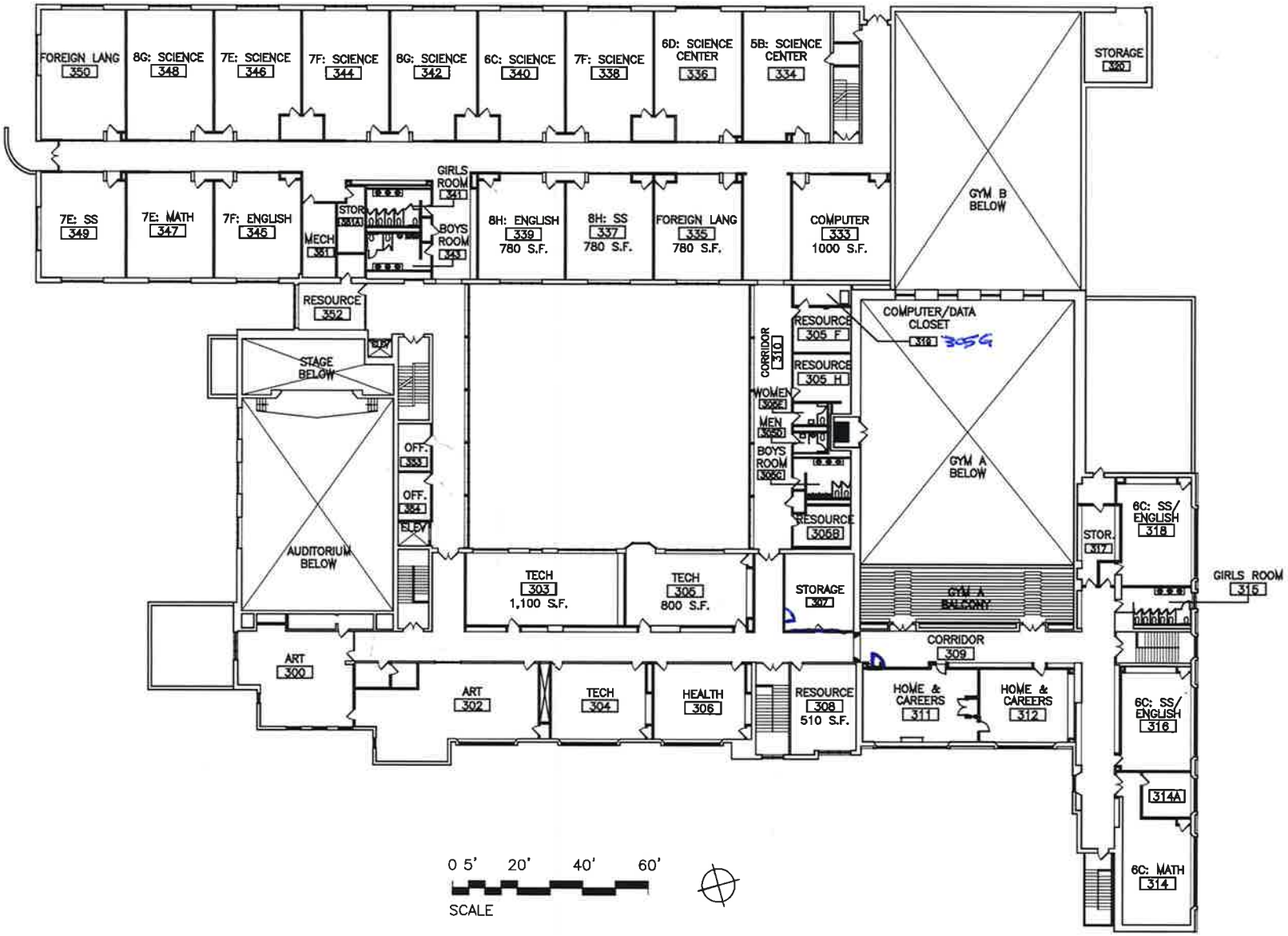
BELL MIDDLE SCHOOL
CHAPPAQUA NEW YORK



KG&D ARCHITECTS PC

THIRD FLOOR PLAN

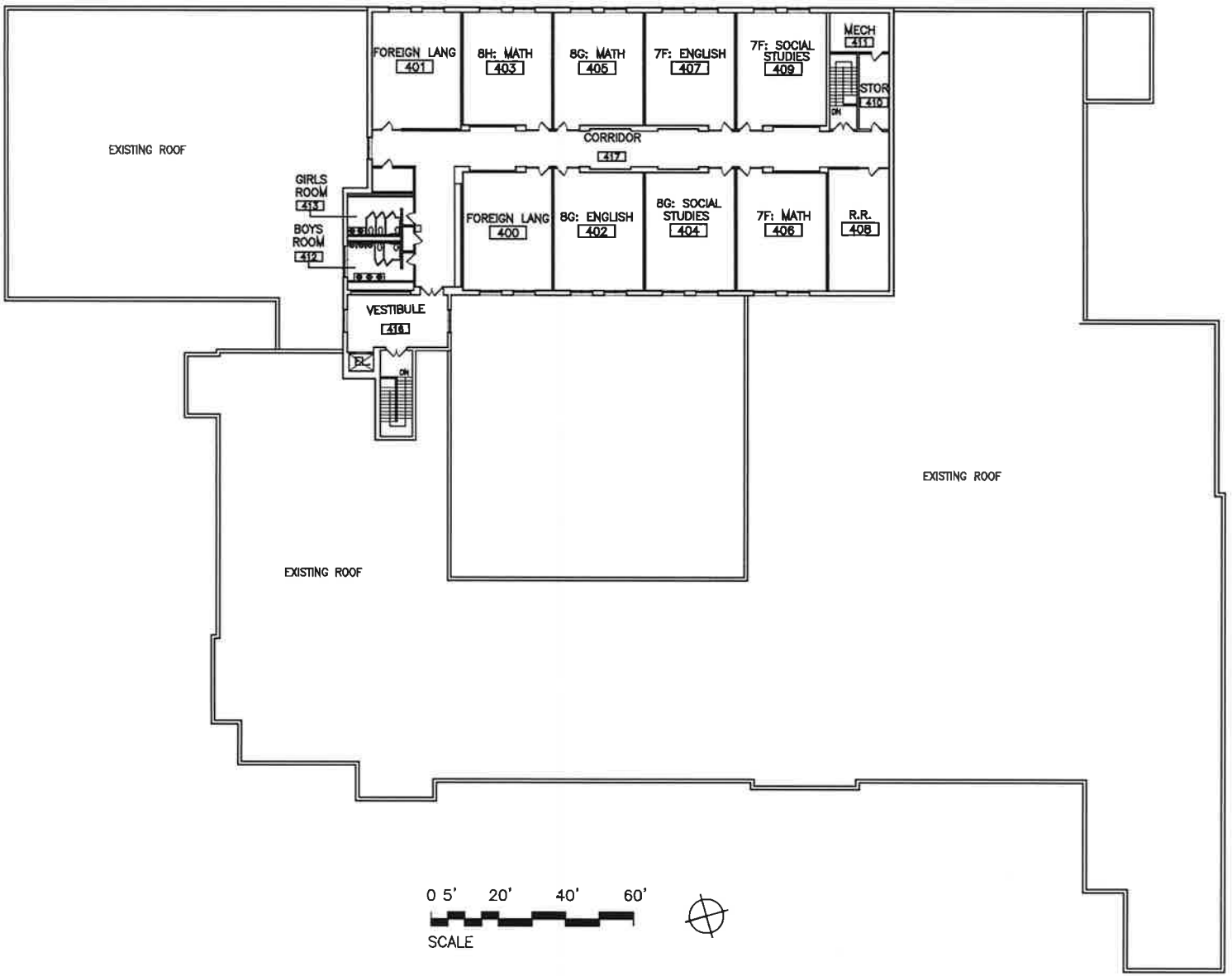
BELL MIDDLE SCHOOL
CHAPPAQUA NEW YORK



KG&D ARCHITECTS PC

FOURTH FLOOR PLAN

BELL MIDDLE SCHOOL
CHAPPAQUA NEW YORK



APPENDIX 2:

HOMOGENEOUS AREA SHEETS

500 Summit Drive, Suite 450
Valhalla, New York 10595

HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Robert E. Bell Middle School

Inspector(s): Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
01	**Pipe Insulation**	**TSI**	**YES**	**YES**
02	**Pipe Fittings**	**TSI**	**YES**	**YES**
03	**Duct Insulation**	**TSI**	**YES**	**YES**
04	**Vibration Cloth**	**M**	**YES**	**NO**
05	**Vinyl Floor Tile**	**M**	**YES**	**NO**
06	**Cementitious Material**	**M**	**YES**	**NO**
07	Wall Plaster, Brown Coat	S	NO	YES
08	Wall Plaster, White Coat	S	NO	YES
09	Ceiling Plaster, Brown Coat	S	NO	YES
10	Ceiling Plaster, White Coat	S	NO	YES
11	Drywall, White	M	NO	YES
12	Joint Compound, White	M	NO	YES
13	Brick Mortar, Gray	M	NO	YES
14	Glazed Brick Mortar, Gray	M	NO	YES
15	Scratch Coat, White	M	NO	YES
16	Glue to Wood Panels, Beige	M	NO	NO
17	Glue Dots assoc. with 1’x1’ Ceiling Tiles, Brown	M	NO	NO
18	1’x1’ Ceiling Tiles, White	M	NO	YES
19	2’x2’ Pinhole Ceiling Tiles, White	M	NO	YES
20	2’x4’ Tectum Ceiling Tiles, Beige	M	NO	YES
21	Mastic assoc. with 12”x12” (Beige) Terrazzo Floor Tiles, Brown	M	NO	NO
22	12”x12” (Beige) Terrazzo Floor Tiles	M	NO	NO
23	Mastic assoc. with 4” Black Cove Base, Beige	M	NO	NO
24	4” Black Cove Base	M	NO	NO
25	Ceramic Floor Tile Mortar, Gray	M	NO	YES
26	Ceramic Wall Tile Backing, Yellow	M	NO	YES
27	Ceramic Wall Tile Grout, White	M	NO	YES
28	**Duct Insulation, White**	**TSI**	**YES**	**YES**

500 Summit Drive, Suite 450
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HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Robert E. Bell Middle School

Inspector(s): Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
29	Canvas to Fiberglass Pipe Insulation, Black	TSI	NO	YES
30	Mudded Elbows assoc. w/ FG Pipe Insulation, Gray	TSI	NO	YES
31	**Covering Insulation to Pipes, Brown**	**TSI**	**YES**	**YES**
32	**Sink/Countertops, Black**	**M**	**YES**	**YES**
33	Compound under Countertops, Black	M	NO	YES
34	New Countertops, Black	M	NO	YES
35	Glue to New Countertops, Yellow	M	NO	NO
36	Compound under Countertops, Beige	M	NO	YES
37	Mastic to 4” Cove Base	M	NO	NO
38	Glue Dots to 1’x1’ Ceiling Tiles	M	NO	NO
39	1’x1’ Spline Ceiling Tiles, White	M	NO	YES
40	Mastic to 9”x9” Floor Tiles, Black	M	NO	NO
41	**9”x9” Beige Floor Tiles**	**M**	**YES**	**NO**
42	Carpet Mastic, Yellow	M	NO	NO
43	Particle Flooring, Brown	M	NO	YES
44	Terrazzo Flooring Mastic to, Cream	M	NO	NO
45	Terrazzo Flooring	M	NO	YES
46	Mastic to 12”x12” Terrazzo Pattern Flooring, Black	M	NO	NO
47	12”x12” Beige Terrazzo Pattern Flooring	M	NO	YES
48	12”x12” Red Terrazzo Pattern Flooring	M	NO	YES
50	12”x12” Terrazzo Pattern Flooring (Centered)	M	NO	YES
51	Leveling Compound, Gray	M	NO	YES
52	Stucco Wall, White	M	NO	YES
53	Wall Plaster, White Coat Only	M	NO	YES
54	Interior Brick Mortar, Gray	M	NO	YES
55	2’x2’ Fissure Ceiling Tiles, White	M	NO	YES
56	2’x4’ Ceiling Tiles, White	M	NO	YES
57	2’x2’ Pinhole Ceiling Tiles	M	NO	YES

500 Summit Drive, Suite 450
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HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Robert E. Bell Middle School

Inspector(s): Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
58	Interior Window Frame Caulking, Black	M	NO	NO
59	Sing Caulking, White	M	NO	NO
60	Glass Block Mortar, Gray	M	NO	YES
61	Tectum Ceiling Tiles, White	M	NO	YES
62	Sink Caulking, White/Tan	M	NO	NO
63	Ceramic Wall Tile Grout	M	NO	YES
64	Ceramic Wall Tile Backing, Gray	M	NO	YES
65	Ceramic Floor Tile Grout/Mortar, Gray	M	NO	YES
66	Ceramic Wall Tile Grout, White	M	NO	YES
67	Ceramic Wall Tile Backing, Gray	M	NO	YES
68	Ceramic Floor Tile Grout/Mortar	M	NO	YES

TSI = Thermal System Insulation S = Surfacing M = Miscellaneous

APPENDIX 3:

HAZARDOUS ASSESSMENT FORM

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT & MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
ROBERT E. BELL MIDDLE SCHOOL
50 SENTER STREET, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
0000	Sub-Floor Pipe Chase	01	Pipe Insulation	1,500 LF	7	-	-	1,500 LF	
1000	1st Floor Plenum	01	Pipe Insulation	900 LF	7	-	-	900 LF	
1001	Boiler Room	01	Pipe Insulation	30 LF	7	-	-	30 LF	4 LF Abated 2018 (2042839.001)
		02	Pipe Fitting	30 LF	7	-	-	30 LF	
1002	Custodian	02	Pipe Fitting	10 LF	7	-	-	10 LF	
1008	Coach's Office Closet	05	Vinyl Floor Tile	20 SF	X	-	-	20 SF	
1009	Coach's Office 117A	05	Vinyl Floor Tile	120 SF	X	-	-	120 SF	
1012	Room 103	01	Pipe Insulation	24 LF	7	-	-	24 LF	Above 2'x2' Ceiling Tile
1014	Room 101	05	Vinyl Floor Tile	710 SF	X	-	-	710 SF	On Terrazzo, 12x12 New Black Color Pattern
1026	Kitchen Area	28	Duct Insulation, White	675 SF	7	-	-	675 SF	2019 Survey Report 2042839.050
1043	Stairwell	01	Pipe Insulation	10 LF	7	-	-	10 LF	
1045	Storage Room	01	Pipe Insulation	140 LF	7	-	-	140 LF	
1047	Room 110	01	Pipe Insulation	50 LF	7	-	-	50 LF	Above 2'x4' Ceiling Tile
2000	2nd Floor Plenum	01	Pipe Insulation	800 LF	7	-	-	800 LF	
		02	Pipe Fitting	100 LF	7	-	-	100 LF	
2042	Music Room 213B Closet	05	Vinyl Floor Tile	500 SF	X	-	-	500 SF	Under Carpeting
2071	Stage	07	Wire Insulation	30 LF	X	-	-	30 LF	Not Found
2088	Storage Room by Gym	05	Vinyl Floor Tile	70 SF	X	-	-	70 SF	9x9 Red/Black
2089	AV Storage Room 224A	05	Vinyl Floor Tile	200 SF	X	-	-	200 SF	9x9 White FT

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT & MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
ROBERT E. BELL MIDDLE SCHOOL
50 SENTER STREET, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
2101	Music Room (Closet)	01	Pipe Insulation	15 LF	7	-	-	15 LF	Area renovated
		05	Vinyl Floor Tile	36 SF	X	-	-	36 SF	New 12x12 White Ft
2105	Music Room	05	Vinyl Floor Tile	120 SF	X	-	-	120 SF	Under Carpet, 9x9 Ft
3000	3rd Floor Plenum	01	Pipe Insulation	800 LF	7	-	-	800 LF	Above 2x2 CT
		02	Pipe Fitting	100 LF	7	-	-	100 LF	
3005A	Art Closet	05	Vinyl Floor Tile	50 SF	X	-	-	50 SF	Covered by 12x12 Grey
3011	Office 352B	05	Vinyl Floor Tile	110 SF	X	-	-	110 SF	9x9 White
3012	Office 352A	05	Vinyl Floor Tile	240 SF	X	-	-	240 SF	9x9 White
3027	Room 305 - Copy Room	04	Vibration Cloth	10 SF	7	-	-	10 SF	
		05	Vinyl Floor Tile	440 SF	X	-	-	440 SF	9x9 Black/Red
3028	Copy Room Storage	05	Vinyl Floor Tile	220 SF	X	-	-	220 SF	9x9 Black/Red
3033	Room 305B	05	Vinyl Floor Tile	380 SF	X	-	-	380 SF	Under Carpeting
3034	Room 305F	05	Vinyl Floor Tile	380 SF	X	-	-	380 SF	Under Carpeting
3035	Room 305G	05	Vinyl Floor Tile	330 SF	X	-	-	330 SF	Under Carpeting
3039	Room 310	06	Cementitious Material	840 SF	X	-	-	840 SF	Not Found
3060	Room 335	05	Vinyl Floor Tile	770 SF	X	-	-	770 SF	
3061	Room 335 Closet	05	Vinyl Floor Tile	7 SF	X	-	-	7 SF	
3062	Room 337	05	Vinyl Floor Tile	810 SF	X	-	-	810 SF	
3063	Room 337 Closet	05	Vinyl Floor Tile	7 SF	X	-	-	7 SF	
3065	Room 339	05	Vinyl Floor Tile	840 SF	X	-	-	840 SF	
3066	Room 339 Closet	05	Vinyl Floor Tile	7 SF	X	-	-	7 SF	
3075	Room 350	05	Vinyl Floor Tile	1,110 SF	X	-	-	1,110 SF	
3076	Room 350 Closet	05	Vinyl Floor Tile	24 SF	X	-	-	24 SF	
3077	Room 349	05	Vinyl Floor Tile	900 SF	X	-	-	900 SF	

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT & MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
ROBERT E. BELL MIDDLE SCHOOL
50 SENTER STREET, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
3078	Room 349 Closet	05	Vinyl Floor Tile	10 SF	X	-	-	10 SF	
3079	Room 347	05	Vinyl Floor Tile	900 SF	X	-	-	900 SF	
3080	Room 347 Closet	05	Vinyl Floor Tile	10 SF	X	-	-	10 SF	
3081	Room 345	05	Vinyl Floor Tile	900 SF	X	-	-	900 SF	9x9 FT
3082	Room 345 Closet	05	Vinyl Floor Tile	10 SF	X	-	-	10 SF	
3083	Room 345B	02	Pipe Fitting	10 LF	7	-	-	10 LF	Accessible
		04	Vibration Cloth	10 SF	7	-	-	10 SF	Accessible
4002	4th Floor Mech. Room	02	Pipe Fitting	26 LF	7	-	-	26 LF	Fiberglass
		04	Vibration Cloth	20 SF	7	-	-	20 SF	Vinyl
4003	Attic	01	Pipe Insulation	200 LF	7	-	-	200 LF	4 LF Abated 2018 (2042839.001)

ASSESSMENT CATEGORIES

1. = Damaged or Significantly Damaged TSI ACBM
2. = Damaged Friable Surfacing ACBM
3. = Significantly Damaged Friable Surfacing ACBM
4. = Damaged or Significantly Damaged Friable Miscellaneous ACBM
5. = ACBM with Potential for Damage
6. = ACBM with Potential for Significant Damage
7. = Any Remaining Friable ACBM or Friable Suspect ACBM
X. = Not Applicable (Material is Nonfriable Surfacing or Miscellaneous Material)

HAZARD RESPONSE TABLE

RESPONSE ACTION #	HAZARD RESPONSE ACTION	ASBESTOS MATERIAL Yes or No	FRIABLE Yes or No	DAMAGED Yes or No	POTENTIAL DISTURBANCE High, Moderate, Low	AIR FLOW Yes or No	ETC Rating	CLASS OF WORK
1	REMOVE ASAP	YES	YES	YES SIGNIFICANT	N/A	N/A	POOR	CLASS I
2	REPAIR, REMOVE, REDUCE DISTURBANCE ASAP	YES	YES	YES	HIGH	N/A	POOR	CLASS I or II
3	REPAIR, REMOVE, REDUCE DISTURBANCE ASAP	YES	YES	YES	MODERATE	YES	POOR	CLASS I or II
4	REPAIR, THEN O&M	YES	YES	YES	MODERATE	NO	POOR	CLASS I, II or III
5	REPAIR, THEN O&M	YES	YES	YES	LOW	YES	POOR	CLASS I, II or III
6	O&M AND THEN SCHEDLE REPAIR	YES	YES	YES	LOW	NO	FAIR	CLASS III or IV
7	REDUCE POTENTIAL FOR DISTURBANCE AND THEN O&M	YES	YES	NO	HIGH	N/A	FAIR	CLASS I, II, III or IV
8	O&M AND THEN REMOVE DISTURBANCE POTENTIAL	YES	YES	NO	MODERATE	N/A	FAIR	CLASS IV
9	O&M	YES	YES	NO	LOW	N/A	GOOD	CLASS IV
10	O&M AND FLOOR CARE/REPAIR	YES	NO	YES	N/A	N/A	FAIR	CLASS III or IV
11	O&M	YES	NO	NO	N/A	N/A	GOOD	CLASS IV

Notes:

N/A = Not Applicable

Damaged Floor Tile - Falls into response action # 10

Significant Damage - Any material with greater than 10 percent overall damage or greater than 25 percent localized damage

Damage - Any material with less than 10 percent overall damage or less than 25 percent localized damage

Ari Flow - Area where Plenums, Air Shaft, Elevator Shaft, Ventilation Shaft, etc., create air flow that can cause erosion of materials

APPENDIX 4:

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 0000 **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	1,500 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1000 **Space Description:** 1st Floor Plenum

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	900 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1001 **Space Description:** Boiler Room

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	26 LF	0 LF	4 LF Abated 2018 (2042839.001)
02	Pipe Fitting	Yes	30 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1002 **Space Description:** Custodian

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fitting	Yes	10 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1008 **Space Description:** Coach's Office Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	20 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1009 **Space Description:** Coach's Office 117A

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	120 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1012 **Space Description:** Room 103

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	24 LF	0 SF	Above 2'x2' Ceiling Tile

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1014 **Space Description:** Room 101

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	710 SF	0 SF	On Terrazo, 12x12 New Black Color Pattern

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1026 **Space Description:** Kitchen Area

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
28	Duct Insulation, White	Yes	675 SF	0 SF	2019 Survey Report 2042839.050

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1043 **Space Description:** Stairwell

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	10 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1045 **Space Description:** Storage Room

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	140 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 1047 **Space Description:** Room 110

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	50 LF	0 LF	Above 2'x4' Ceiling Tile

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2000 **Space Description:** 2nd Floor Plenum

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	800 LF	0 LF	
02	Pipe Fittings	Yes	100 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2042 **Space Description:** Music Room 213B Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	500 SF	0 SF	Under Carpeting

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2071 **Space Description:** Stage

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
07	Wire Insulation	No	30 LF	0 LF	Not Found

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2088 **Space Description:** Storage Room by Gym

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	70 SF	0 SF	9x9 Red/Black

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2089 **Space Description:** AV Storage Room 224A

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	200 SF	0 SF	9x9 White FT

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2101 **Space Description:** Music Room Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	15 LF	0 LF	Area renovated
05	Vinyl Floor Tile	No	36 SF	0 SF	New 12x12 White FT

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 2105 **Space Description:** Music Room

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	120 SF	0 SF	Under carpet, 9x9 FT

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3000 **Space Description:** 3rd Floor Plenum

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	800 LF	0 LF	Above 2x2 CT
02	Pipe Fitting	Yes	100 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3005A **Space Description:** Art Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	50 SF	0 SF	Covered by 12x12 Grey

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3011 **Space Description:** Office 352B

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	110 SF	0 SF	9x9 White

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3012 **Space Description:** Office 352A

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	240 SF	0 SF	9x9 White

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3027 **Space Description:** Room 305 – Copy Room

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
04	Vibration Cloth	No	10 SF	0 SF	
05	Vinyl Floor Tile	No	440 SF	0 SF	9x9 Black/Red

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3028 **Space Description:** Copy Room Storage

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	220 SF	0 SF	9x9 Black/Red

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3033 **Space Description:** Room 305B

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	380 SF	0 SF	Under Carpeting

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	**July 2025**

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3034 **Space Description:** Room 305F

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	380 SF	0 SF	Under Carpeting

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3035 **Space Description:** Room 305G

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	330 SF	0 SF	Under Carpeting

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	**July 2025**

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3039 **Space Description:** Room 310

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
06	Cementitious Material	No	840 SF	0 SF	Not Found

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3060 **Space Description:** Room 335

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	770 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3061 **Space Description:** Room 335 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	7 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3062 **Space Description:** Room 337

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	810 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3063 **Space Description:** Room 337 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	7 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3065 **Space Description:** Room 339

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	840 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3066 **Space Description:** Room 339 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	7 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3075 **Space Description:** Room 350

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	1,110 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3076 **Space Description:** Room 350 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	24 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3077 **Space Description:** Room 349

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	900 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3078 **Space Description:** Room 349 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	10 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3079 **Space Description:** Room 347

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	900 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3080 **Space Description:** Room 347 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	10 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3081 **Space Description:** Room 345

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	900 SF	0 SF	9x9 FT

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3082 **Space Description:** Room 345 Closet

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	Vinyl Floor Tile	No	10 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 3083 **Space Description:** Room 345B

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fitting	Yes	10 LF	0 LF	Accessible
04	Vibration Cloth	No	10 SF	0 SF	Accessible

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 540
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 4002 **Space Description:** 4th Floor Mechanical Room

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fitting	Yes	26 LF	0 LF	Fiberglass
04	Vibration Cloth	No	20 SF	0 SF	Vinyl

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: 4003 **Space Description:** Attic

School District: Chappaqua Central School District

School Name: Robert E. Bell Middle School

Re-inspected By: Dmitri Kirnossenko **Date:** June 14, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	200 LF	0 LF	4 LF Abated 2018 (2042839.001)

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

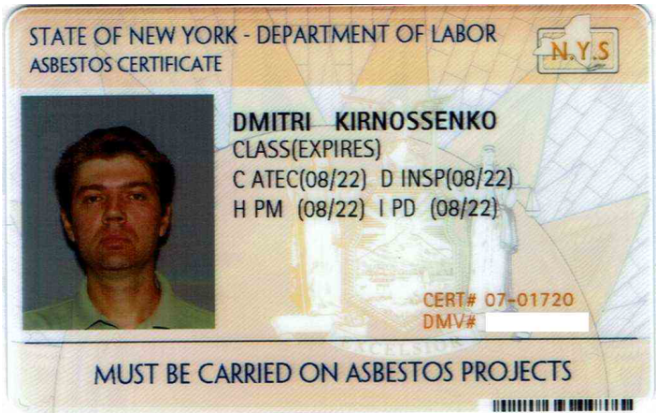
[1] Material Condition, Accessibility to Public, Warning Labels, etc.

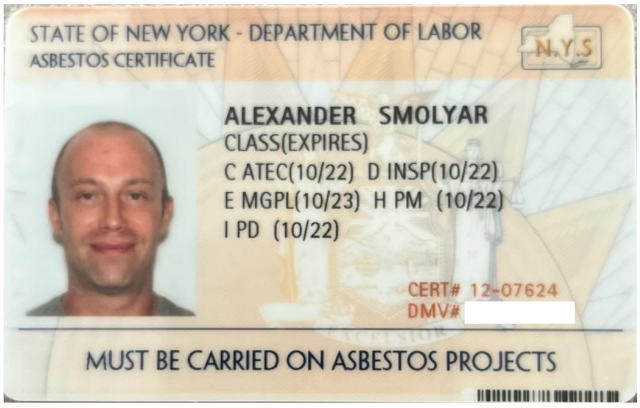
APPENDIX 5:

BULK SAMPLE ANALYSIS RESULTS AND PREVIOUS SAMPLING DATA

APPENDIX 6:

INSPECTOR AND MANAGEMENT PLANNER CERTIFICATIONS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
DMITRI KIRNOSSENKO
CLASS(EXPIRES)
C ATEC(08/22) D INSP(08/22)
H PM (08/22) I PD (08/22)
CERT# 07-01720
DMV#
MUST BE CARRIED ON ASBESTOS PROJECTS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
ALEXANDER SMOLYAR
CLASS(EXPIRES)
C ATEC(10/22) D INSP(10/22)
E MGPL(10/23) H PM (10/22)
I PD (10/22)
CERT# 12-07624
DMV#
MUST BE CARRIED ON ASBESTOS PROJECTS

APPENDIX 7:

SUMMARY OF ABATEMENT ACTIVITIES

APPENDIX 8:

40 CFR PART 763 (EPA AHERA)

REGULATED BUILDING MATERIALS SURVEY REPORT

For

Horace Greeley High School
70 Roaring Brook Road
Chappaqua, New York 10514

Prepared For:

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, New York 10514

Prepared By:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, New Jersey 07054

Craig Napolitano, CHMM
Associate

LANGAN

October 25, 2023
Langan Project No. 101061220

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TABLES

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Appendix C Langan's Certifications and Laboratory Accreditations
Appendix D File Search/Archive Materials/Scope of Work Drawings

ACRONYMS

RBM	Regulated Building Materials (RBM) includes but is not limited to (Asbestos Containing Materials (ACM), Lead Containing Paint (LCP), Polychlorinated Biphenyls (PCBs), Ozone Depleting Substances (ODS), Radioactive Sources, Oil-containing Equipment, Universal Waste, and Electronic Wastes
USEPA	United States Environmental Protection Agency
NYSDOL	New York State Department of Labor
AHERA	Asbestos Hazard Emergency Response Act
OSHA	Occupational Safety and Health Administration
CAA	Clean Air Act
TSCA	Toxic Substance Control Act
CFR	Code of Federal Regulation
EPA	United States Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HUD	Housing and Urban Development
NESHAPS	National Standards for Hazardous Air Pollutants
RCRA	Resource Conservation and Recovery Act
PLM	Polarized Light Microscopy
TEM	Transmission Electron Microscopy
ACM	Asbestos-Containing Materials
LBP	Lead-Based Paint
PCB	Polychlorinated Biphenyls (PCB)
SF	Square Feet
LF	Linear Feet
mg/cm^2	Milligrams per square centimeter
PPM	Parts Per Million
XRF	X-ray Fluorescence
AAS	Atomic Absorption Spectrometry
TCLP	Toxicity Characteristic Leaching Procedure
	Definition of Regulated building materials will be needed

EXECUTIVE SUMMARY

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of the Chappaqua Central School District and summarizes regulated building materials (RBM) survey findings for the select areas of the Horace Greeley High School, at 70 Roaring Brook Road, Chappaqua, NY 10514. To address potential exposure by the planned building renovation, the objective of this RBM survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP) and polychlorinated biphenyls (PCBs) containing caulk/sealants,

PROJECT INFORMATION:

Client Name:	Chappaqua Central School District	Survey Dates:	October 16,17,18,19, 2023
Professional's Project #:	101061220	Construction Dates:	Circa 1930's
Professional's Project Manager:	Craig Napolitano	No. of Building(s):	1
Phone No.:	646-210-6500	No. of Stories:	3
Email:	cnapolitano@langan.com	Estimated Gross Footage:	~190,000 SF
Property Address:	70 Roaring Brook Road	Basement:	Yes
Property Town, County, State:	Chappaqua, New York 10514	Property Use:	High School
Property Identification:	---	Last Altered	---

KEY FINDINGS

Asbestos-Containing Materials (ACM)

The following materials were reported to contain asbestos exceeding one percent (>1%) and are ACM or were not sampled but are assumed as ACM:

Material	Location	Survey Results		Estimated Quantity
ACM/ASSUMED ACM FINDINGS WITHIN SURVEYED BUILDING AREAS				
Building Interiors				
Gypsum Board Joint Compound	Building K throughout (amount to be disturbed by fire alarm SOW is TBD	ACM	1.5% Chrysotile	TBD SF
Tar Paper/Mastic on Metal Deck (Layer 4)	Roof Building L (Amount to be disturbed by SOW is TBD	ACM	12.0% Chrysotile	19,300 SF
Braided Wire Insulation	Telescope/Observatory Building	Assumed/Live Electric		200 LF
Waterproofing under concrete slab & foundation	Telescope/Observatory Building	Assumed to Exist/No probes/demo was done		300 SF
Waterproofing under concrete slab & foundation	Snack Bar/Food Stand	Assumed to Exist/No probes/demo was done		475 SF
Pipe Insulation/Fittings	Building H, Lower Level Electrical Room	ACM as per August 2022 AHERA Report (Amount to be disturbed by current scope of work, TBD)		90 LF
Pipe Insulation/Fittings	Scattered Locations throughout the areas surveyed			330 LF
Pipe Insulation/Fittings/Roof Drain Insulation (4 locations)	Ceiling area of small gym/Blg A			40 LF
Pipe Insulation/Fittings	Ceiling area of main gym/Blg A			18 LF
Pipe Insulation/Fittings	Ceiling area of fitness center/Blg A-west wall			15 LF

The bulk samples collected by Langan from the other suspect building materials were reported by the laboratory as "no asbestos detected". Refer to Table 1 for a summary of asbestos survey findings and Appendix A for a copy of test results and chain of custody documentation.

Lead Containing Paint (LCP)

Langan conducted 194 assays using an X-Ray Fluorescence (XRF) analyzer to screen the structure to identify lead concentrations in painted surfaces. Of the 194 XRF readings, 13 measurements had detectable concentrations of lead above 1.0 mg/cm^2. The paint on following building components were identified to contain lead above 1.0 mg/cm^2.

- Food Stand, White Interior Wall Paint, 1.8 mg/cm^2.
- Food Stand, White Exterior Wall Paint, 1.1 mg/cm^2.
- Building A, Gym Mechanical Room Wall Dark Orange Paint, 1.4 mg/cm^2.
- Building A, Main Gym Brick (big) Wall Gray Paint, 1.2 mg/cm^2.
- Building B, Auditorium Side Hallway Wall White Paint, 1.1 mg/cm^2.
- Building B, Auditorium Stage White Paint, 2.1 mg/cm^2.
- Building C, Classroom C4, Blue Wall Paint, 4.0 mg/cm^2.
- Building D, Classroom D5, White Wall Paint, 2.6 mg/cm^2.
- Building D, Classroom D1, White Wall Paint, 1.3 mg/cm^2.
- Building G, Hallway by Art Office, White Wall Paint, 7.1 mg/cm^2.
- Building G, Studio 1, White Wall Paint, 3.5 mg/cm^2.
- Building F, Room F1, Blue Wall Paint, 1.8 mg/cm^2.
- Building E, Room E1, Blue Wall Paint, 3.8 mg/cm^2.

Overall, the paint on various building components was observed in good condition. Refer to Table 2 for the XRF screening data.

PCBs Findings

As per USEPA Code of Federal Regulations (40 CFR 761.3) a PCB containing bulk product is any product which contains a concentration of PCB >50 PPM. Any product which contains <50 PPM PCB is considered a non-PCB product.

Four (4) composite bulk samples of suspect caulking/sealant was collected from Caulking associated with the telescope building, building L HVAC units and roof canopy metal counter flashing submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

1.0 INTRODUCTION

1.1 Purpose

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of the Chappaqua Central School District summarizes the regulated building materials (RBM) survey findings for the Horace Greeley High School Capital Improvement project, located at 70 Roaring Brook Road, Chappaqua, NY 10514.

To address potential exposure by the planned building renovation, the objective of this RBM survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP), polychlorinated biphenyls (PCBs) containing caulk/sealants that may be disturbed in the upcoming renovation.

The remainder of this report presents our observations, findings, laboratory test results of samples collected, plans showing sampling locations, approximate locations of ACM and conclusions.

1.2 Assumptions, Limitations and Exceptions

Opinions, conclusions and recommendations presented in this report apply to the site conditions those reasonably foreseeable based solely upon Langan's visual observations of accessible areas, laboratory test data, and current regulatory requirements. They cannot necessarily apply to conditions and features of which Langan is unaware and has not had the opportunity to evaluate. The conclusions noted in this report are intended exclusively for the purpose stated herein, at the site indicated, and for the project indicated.

No survey method can completely eliminate the possibility of obtaining partial, imprecise, or incomplete information. Thus, the report does not warranty, guaranty, or represent that the surveys completely defined the locations, and/or condition of any RBMs and hazardous materials. Professional judgment was exercised in gathering and analyzing the information obtained, and Langan performed our services using that degree of skill and care ordinarily exercised under similar conditions by reputable members of Langan's profession practicing in the same or similar locality at the time of our performance.

Any suspect materials found during building remodeling, renovation or demolition which differ from materials sampled as part of this survey should be assumed to be asbestos-containing until surveyed by a properly trained and certified individual and tested by an accredited laboratory.

2.0 SITE DESCRIPTION

The surveyed Horace Greeley High School is located at 70 Roaring Brook Road, Chappaqua, New York and it belongs to the Chappaqua Central School District with facilities approximately 60-80 years old. The school district is located approximately 90 miles north of New York City in Westchester County NY.
The two-story subject building is constructed out of stone, brick and steel and houses a High school.

3.0 ASBESTOS CONTAINING MATERIALS

3.1 Terminology

Suspect Asbestos-Containing Materials

Asbestos was used in certain types of construction and building materials. A few examples of these materials include floor tiles, ceiling panels, thermal system insulation, fireproofing insulation, roofing materials, etc. Until a material is examined using light microscopy or a similar technique, the building material is considered as a suspect asbestos-containing material. Any suspect ACM of unknown asbestos content (that is not tested) should be handled as if it were an asbestos containing material.

Asbestos–Containing Material (ACM)

According to Federal Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP), OSHA, New York State Department of Labor, Industrial Code Rule 56 (NYSDOL-ICR56) regulations, a material that is confirmed to contain greater than one percent (>1%) asbestos by polarized-light microscopy (PLM) analysis is classified as ACM. Under current EPA-NESHAP and NYSDOL-ICR56 regulations, materials that are confirmed to contain one percent or less asbestos (<1%) are considered non-ACM and are not regulated. However, the Occupational Safety and Health Administration (OSHA) still regulates these materials under its asbestos regulations. Therefore, there can be situations where EPA NESHAP regulations may not apply for specific materials, but OSHA regulations are applicable.

The EPA rule concerning the application, removal, and disposal of ACM is administered under NESHAP regulations 40 CFR 61.145, Subpart M – Standard for Demolition and Renovation. NESHAP only regulates ACM when it meets certain criteria, which is called Regulated ACM (RACM). RACM consists of

- Friable asbestos material
- Category I non-friable ACM that has become friable
- Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or
- Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Whether Friable or Category I & II materials, all ACM are regulated as per the NYSDOL-ICR56 regulations.

3.2 Survey Methodology

Langan conducted an ACM survey in general accordance with the applicable requirements of current EPA NESHAP Standard 40 CFR 61, Subpart M (Asbestos), NYSDOL-ICR56, and OSHA 29 CFR 1926.1101 asbestos survey and/or sampling protocols and sound judgement of the asbestos inspector(s).

Destructive and intrusive inspection techniques were not employed. Langan inventoried, classified, and collected representative bulk samples from suspect homogeneous areas (HAs) and submitted the samples for analysis. HAs are materials that appear similar in color, texture, and date of material application. The condition, and approximate location of each identified suspect ACM were documented.

Samples collected were properly packaged in individual plastic bags, sealed; catalogued and chain-of-custody documentation was completed. Laboratory analysis was performed following EPA 600/R-93/116 Method using Polarized Light Microscopy with Dispersion Staining (PLM/DS) which utilizes Visual Area Estimation (VAE) for determining concentrations of asbestos in a sample. Non-friable organically bound (NOB) materials which tested non-ACM via PLM were analyzed using transmission

electron microscopy (TEM). Analytical testing was performed in accordance with NYSELAP Methods 198.1 (friable materials), 198.1(NOB), 198.4 (NOB-TEM), and 198.8 (surfacing materials containing vermiculite). Samples were analyzed by AmeriSci laboratory of New York (AmeriSci). AmeriSci is a member of the American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP).

3.3 Files Review

Langan received and reviewed the following reports:

- AHERA Management Plan dated August 2022
- KD&G Design Development Scope for Work Drawings dated August 31st, 2023

3.4 Observations and Findings

The ACM survey of the subject building areas was conducted on October 16 through 19th, 2023 by Langan's Sanjay Patel, a NYSDOL certified asbestos inspector and USEPA certified lead inspector. During the survey, suspect materials observed in the surveyed building areas were documented, assessed, quantified, and sampled as necessary.

Suspect materials identified as having asbestos content greater than one percent by weight are considered to be "positive" for asbestos in accordance with the EPA/NYSDOL definition of an asbestos-containing material. In general, suspect materials identified in the building were in good to fair conditions.

Refer to Table 1 for a detailed summary of asbestos survey findings. A copy of analytical results and chain of custody documentation for the samples collected during the surveys is provided in Appendix A. Asbestos sampling locations are depicted on Figures.

3.5 Condition and Friability Assessment Table

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

Material	Location	Friability	Condition	Estimated Quantity
Tar Paper/Mastic on Metal Deck (Layer 4)	Roof of Building L	No	Good	19,300 SF
Gypsum Board Joint Compound	Building K First & Second Floors throughout	Yes	Good	TBD SF
Braided Wire Insulation	Telescope/Observatory Building	Yes	Poor	300 LF
Waterproofing under concrete slab & foundation	Telescope/Observatory Building & Snack Bar	No	Good	775 SF
Pipe Insulation/Fittings/Roof Drain Insulation (4 locations)	Scattered Locations throughout the areas surveyed	Yes	Fair	493 LF

Condition Definitions:

Good: None/Minimal apparent damage to ACM

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

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

4.0 LEAD CONTAINING PAINT

4.1 Terminology

Lead Based Paint

As per EPA 40 CFR Part 745, TSCA, Title IV (Lead Exposure Reduction) the term ''lead-based paint'' means paint or other surface coatings that contain lead equal to or in excess of 1.0 milligrams per centimeter squared (1.0 mg/cm^2) or more than 0.5 percent by weight. Although Langan recognizes that the EPA definition of LBP is only applicable to certain residential and child-occupied structures, we are using the EPA LBP definition as a threshold for reporting.

Lead Containing Paint (LCP) or Material Containing Lead

Occupational Safety and Health Administration (OSHA) consider any measurable concentration of lead in paint or material to be lead containing paint (LCP) or lead containing material (LCM).

4.2 Limited Screening Survey Methodology

On October 17th, 2023, Langan conducted a limited lead paint screening test of painted building components. The purpose of the lead paint screening was to determine the general presence of lead-containing paints at the site. OSHA considers any concentration of lead in paint to be lead containing paint according to the OSHA Lead in Construction standard (29 CFR 1926.62).

A Heuresis Pb200i X-Ray Fluorescence (XRF) Spectrum Analyzer was used to survey the subject building for the presence of lead-containing paint (LCP). The Heuresis Pb200i analyzer uses a cobalt 57 radioactive source and an advanced solid-state radiation detector to generate an x-ray fluorescence spectrum of a painted surface. During the analysis, the intensity of the x-rays is converted by the instrument's internal software into an estimate of the concentration of lead in the substance being analyzed. The results are interpreted as concentrations of lead in milligrams per square centimeter (mg/cm^2). This device is a field-screening tool, used to collect multiple readings in a short period of time. The method of measurement is based on spectrometric analysis of lead x-ray fluorescence within a controlled depth of interrogation. The reading is an estimate of lead content in all layers of paint.

Not all painted surfaces were tested within the surveyed building areas as the purpose of the limited screening testing was to ascertain a general understanding of the presence of lead-containing paint and coatings throughout the building. Building components were selected for testing based upon the frequency of their appearance throughout the building and relevance for significantly impacting the proposed interior demolition and renovation activities and not for determining the potential lead hazards related to occupancy of the building.

For quality control, the XRF instrument was calibrated using a U.S. Department of Commerce. National Institute of Standards and Technology (NIST) Level III 1.0 mg/cm2 lead based paint film. For each calibration, three (3) XRF readings were taken on the paint film. The average of these three (3) readings was then subtracted from the known lead content in the paint film. The difference was compared with an Environmental Protection Agency (EPA)-approved tolerance range. Such calibration procedures were conducted at the start and at the end of the workday.

4.3 LBP Findings

Based on the XRF screening data, the paint on following building components was identified to contain lead above 1.0 mg/cm^2:

- Food Stand, White Interior Wall Paint, 1.8 mg/cm^2.
- Food Stand, White Exterior Wall Paint, 1.1 mg/cm^2.
- Building A, Gym Mechanical Room Wall Dark Orange Paint, 1.4 mg/cm^2.
- Building A, Main Gym Brick (big) Wall Gray Paint, 1.2 mg/cm^2.
- Building B, Auditorium Side Hallway Wall White Paint, 1.1 mg/cm^2.
- Building B, Auditorium Stage White Paint, 2.1 mg/cm^2.
- Building C, Classroom C4, Blue Wall Paint, 4.0 mg/cm^2.
- Building D, Classroom D5, White Wall Paint, 2.6 mg/cm^2.
- Building D, Classroom D1, White Wall Paint, 1.3 mg/cm^2.
- Building G, Hallway by Art Office, White Wall Paint, 7.1 mg/cm^2.
- Building G, Studio 1, White Wall Paint, 3.5 mg/cm^2.
- Building F, Room F1, Blue Wall Paint, 1.8 mg/cm^2.
- Building E, Room E1, Blue Wall Paint, 3.8 mg/cm^2.

In general, the painted surfaces were observed in good to fair condition. Localized areas of minor damage were observed. Refer to Table 2 for the XRF screening data.

5.0 PCBs SURVEY FINDINGS

5.1 Limited Survey Methodology

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

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.
PCBs are regulated under the EPA Toxic Substance Control Act (TSCA) regulations (40 CFR 261) program as well as EPA regulation 40 CFR 761. As per EPA 40 CFR 761.3, PCB-containing bulk product waste is any waste from demolition or renovation projects

which contains PCBs concentration greater than 50 mg/kg. Any product containing less than 50 mg/kg PCBs is considered a non-PCB product.

A PCB screening sampling involved a visual examination of the building and sampling of suspect caulking or sealant materials.

5.2 PCBs Findings

As per USEPA Code of Federal Regulations (40 CFR 761.3) a PCB containing bulk product is any product which contains a concentration of PCB >50 PPM. Any product which contains <50 PPM PCB is considered a non-PCB product.

Four (4) composite bulk samples of suspect caulking/sealant was collected from Caulking associated with the telescope building, building L HVAC units and roof canopy metal counter flashing submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

6.0 CONCLUSIONS

6.1 Asbestos Containing Materials

Asbestos containing materials were identified in the building surveyed areas. Refer to Table 1 for the summary of a limited asbestos survey findings. Identified ACM affected by the scope of work shall only be removed by a properly certified asbestos abatement contractor in accordance with applicable federal, state, and local regulations prior to being disturbed, including maintenance, renovation, or demolition activities. As required by the NYSDOL regulations, the abatement project must be monitored by a NYS-DOL certified project monitor. Proper notifications must be filed with the US-EPA, NYS-DOL and other regulatory agencies prior to performing such activities.

In accordance with the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) established National Emission Standards for hazardous Air Pollutants (NESHAP) to protect the public from exposure to airborne pollutants. Asbestos was one of the air pollutants, which was addressed under the NESHAP 40 CFR Part 61. The purpose of asbestos NESHAP regulations is to protect the public health by minimizing the release of asbestos when facilities, which contain ACM, are being renovated or demolished. The EPA is responsible for enforcing regulations related to asbestos during renovations and demolition, however, the CAA allows the EPA to delegate this authority to State and Local Agencies. Even after EPA delegate's responsibility to a state or Local agency,

EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

6.2 Lead Containing Paint

Painted surfaces in the building contain detectable concentrations of lead. The OSHA Lead in Construction Standard does not currently define a specific concentration of lead that must be present within paint for it to be considered "lead-containing." Therefore, painted and glazed surfaces that contain detectable concentrations of lead must be handled in accordance with the OSHA Lead in Construction Standard. Persons performing work that could impact paint films or glazing that have detectable concentrations of lead should be informed of the testing results, and take appropriate actions to comply with the OSHA Lead in Construction Standard.

Personnel performing work on lead-containing surface coatings must have, at a minimum, two-hour lead awareness training in accordance with OSHA Standard 29 CFR 1926.62. If lead-containing surface coatings are required to be stripped or removed from the building component substrate in the areas noted above with lead-containing paint, then additional training would be required based upon the measured lead concentration of the surface coating and the airborne lead concentrations measured during the work activity.

The handling, disposal, and management of waste generated during any restoration, renovation, or demolition operations is regulated by the Resource Conservation and Recovery Act (RCRA) regulations, Standards 40 CFR 240 - 280. These regulations require that a Toxic Characteristic Leaching Procedure (TCLP) test be utilized to determine if the waste generated during demolition, renovation, or removal projects is considered hazardous waste. A material is considered hazardous if it is ignitable, reactive, corrosive, or toxic. Toxicity is determined by TCLP analysis, which simulates the migration of a contaminant, such as cadmium, arsenic, or lead, in a disposal site. TCLP sampling was not part of the scope of work for this project. Therefore, prior to demolition it is recommended that representative samples of the building to be demolished be sampled and analyzed accordingly to determine if the construction debris would be considered a hazardous waste.

6.3 Polychlorinated Biphenyls (PCBs) Containing Materials

Four (4) composite bulk samples of suspect caulking/sealant was collected from Caulking associated with the telescope building, building L HVAC units and roof canopy

metal counter flashing submitted for PCB analysis. PCBs concentration in the caulk were below 50 parts per million (PPM). Test results are summarized in Table 3.

7.0 STATEMENT OF QUALIFICATIONS AND SIGNATURES

The information contained in this report is based on visual observations of the building and laboratory analytical data of the samples collected during the site visit(s). The survey was performed by Qualified Environmental Professional Mr. Sanjay Patel. These individual(s) have specific qualifications based on education, training, and/or experience to assess a property of the nature, history, and setting of the Subject Properties. Certifications of the Environmental Professionals who performed this Asbestos Survey are provided in Appendix C.

Langan Engineering, Environmental, Surveying,
Landscape Architecture, and Geology, D.P.C.

Sanjay Patel
NYSDOL Asbestos
USEPA Lead Inspector
Cert #
NYSDOL Asbestos
Inspector Cert# 98-10216

TABLES

Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Material	Sample ID	Location	Survey Results		Estimated Quantity of ACM		Notes/Comments
ACM/ASSUMED ACM FINDINGS							
Building Interiors							
L1: Built up roofing material 3/8"	RM-3	Roof over Blg L	ACM	-- --	19,300	SF	ACM contaminated (quanitity to be determined by scope
L2: 1/2" gypsum board			ACM	-- --			
L3: Felt paper under 10" foam insulation			ACM	-- --			
L4:Tar Paper/Mastic on Metal Deck (Layer 4)			ACM	CHRY 12.0%			Bottom layer is ACM
Gypsum Board Joint Compound	JC-5	Building K First & Second Floorsm Throughout	ACM	CHRY 1.5%	TBD	SF	Quantity to be affected by scope of work is to be determined/Fire Alarm
Braided Wire Insulation	--	Telescope/Observatory Building	Assumed /Live Electric		200	LF	Wiring in box on wall and conduits throughout
Waterproofing under concrete slab & foundation		Telescope/Observatory Building	Assumed to exist		300	SF	Assumed to existed below slab/foundation, no probes were performed due to active blg
Waterproofing under concrete slab & foundation	--	Snack Bar/Food Stand	Assumed to exist		475	SF	
Pipe Insulation/Fittings	--	Building H, Lower Level Electrical Room	ACM	-- --	90	LF	ACM as per August 2022 AHERA report by WSP. Not to be affected by current scope of work/Fire alarms
Pipe Insulation/Fittings	--	Scattered locations throughout the areas surveyed	ACM	-- --	330	LF	ACM as per August 2022 AHERA report by WSP. Not to be affected by current scope of work/Fire alarms
Pipe Insulation/Fittings/Roof Drain Insulation (4 Locations)	--	Ceiling area of Small Gym, Blg A	ACM	-- --	40	LF	Ceiling High, to be determined if affected by HVAC scope of work
Pipe Insulation/Fittings	--	Ceiling area of Main Gym, Blg A	ACM	-- --	18	LF	
Pipe Insulation/Fittings	--	Ceiling area of Fitness Center, Blg A	ACM	-- --	15	LF	
NON-ACM FINDINGS							
Telescope/Observatory Building							
Gypsum Board	SR-1	Telescope Building	Non-ACM	ND	--	--	---
Cinderblock Mortar	CM-1	Telescope Building	Non-ACM	ND	--	--	---
Stucco Plaster	ST	Exterior Perimeter Walls	Non-ACM	ND	--	--	---
Plaster associated with column base under telescope	PL-1-3	Interior Base of Telescope	Non-ACM	ND	--	--	---
Caulking associated with metal sheet joints around the dome	MSC-1	Exterior/interior dome	Non-ACM	ND	--	--	---
Door Caulking	DC-1	Interior/Exterior	Non-ACM	ANTH <1.0%	--	--	
Black packing materials associated with concrete floorand cinderblock wall joint	FWJM-1	Interior Perimeter Walls	Non-ACM	ND	--	--	At base of floor/walls
Food Stand/Snack Bar Builing							
Cinderblock Mortar	CM-1	Food Stand/Snack Bar	Non-ACM	ND	--	--	---
Stucco Plaster	ST-1-3	Exterior Perimeter Walls	Non-ACM	ND	--	--	---
Grout associated with quarry tile	QTGR-1	Food Stand/Snack Bar	Non-ACM	ND	--	--	---
Bedding Mortar associated with quarry tile	QTBM-1	Food Stand/Snack Bar	Non-ACM	ND	--	--	---
2'x2' with pin holes ceiling panels	CPP-1	Food Stand/Snack Bar	Non-ACM	ND	--	--	---
Roofing shingles and associated tar paper	RS-1	Food Stand/Snack Bar	Non-ACM	ND	--	--	---
Masonry Mortar	MM-1	Mortar associated with stone wall near stand	Non-ACM	ND	--	--	---
High School Building Interiors							
Masonry Mortar	MM-1	Scattered locations throughout the areas surveyed	Non-ACM	ND	--	--	---
Spray-on Fireproofing	FP	Building J First & Second Floor Throughout	Non-ACM	ND	--	--	---
Gypsum Board	SR-1	Building A, Scattered throughout	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-1	Building A, Scattered throughout	Non-ACM	ND	--	--	---
Gypsum Board	SR-2	Building B, Scattered throughout	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-2	Building B scattered locations	Non-ACM	ND	--	--	---
Gypsum Board	SR-3	Scattered throughout Building C & D	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-3	Scattered throughout Building C & D	Non-ACM	ND	--	--	---

Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Material	Sample ID	Location	Survey Results		Estimated Quantity of ACM		Notes/Comments
Gypsum Board	SR-4	Scattered throughout Building J	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-4	Scattered throughout Building J	Non-ACM	ND	--	--	---
Gypsum Board	SR-5	Scattered throughout Building K	Non-ACM	ND	--	--	---
Gypsum Board	SR-6	Scattered throughout Building G-Lab	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-6	Scattered throughout Building G-Lab	Non-ACM	ND	--	--	---
Gypsum Board	SR-7	Scattered throughout Building F & E	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-7	Scattered throughout Building F & E	Non-ACM	ND	--	--	---
Gypsum Board	SR-8	Scattered throughout Building H	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-8	Scattered throughout Building H	Non-ACM	ND	--	--	---
Gypsum Board	SR-9	Scattered throughout Building L	Non-ACM	ND	--	--	---
Gypsum Board Joint Compound	JC-9	Scattered throughout Building L	Non-ACM	ND	--	--	---
2'x2' with small pinholes ceiling panel	CPP-1-A	Scattered throughout Building A	Non-ACM	ND	--	--	---
2'x4' with small grooves and pinholes ceiling panel	CPP-2	Scattered throughout Building A	Non-ACM	ND	--	--	---
2'x4' with small grooves and pinholes ceiling panel	CPP-3	Scattered throughout Building A	Non-ACM	ND	--	--	---
2'x4' with grooves and pinholes ceiling panel	CPP-4	Scattered throughout Building B & C	Non-ACM	ND	--	--	---
2'x2' with small grooves and pinholes ceiling panel	CPP-5	Scattered throughout Building L & G	Non-ACM	ND	--	--	---
Various size gypsum ceiling panel	CPP-6	Scattered throughout Building K & H	Non-ACM	ND	--	--	---
2'x4' with 6-inch wide stripes ceiling panel	CPP-7	Scattered throughout Building F,K & G	Non-ACM	ND	--	--	---
2'x4' with big grooves and pinholes ceiling panel	CPP-8	Studio 1-Building G	Non-ACM	ND	--	--	---
Building Exterior-Roofs							
L1: Built up roofing material 3/8"	RM-1	Roof A over fitness and small gym	Non-ACM	ND	--	--	Roof 1
L2: 1/16" tar paper under 2" fiberglass insulation			Non-ACM	ND	--	--	
L3: Felt paper under 2" foam on metal deck			Non-ACM	ND	--	--	
L1: Built up roofing material 3/8"	RM-2	Roof A over large gym	Non-ACM	ND	--	--	Roof 2
L2: 1/16" tar paper under 2" fiberglass insulation			Non-ACM	ND	--	--	
L3: Felt paper under 2" foam on metal deck			Non-ACM	ND	--	--	
L4: 1/16 tar paper on tectum deck			Non-ACM	ND	--	--	
L5: Tectum roof deck			Non-ACM	ND	--	--	
Roof Flashing/Mastic	RF-1	Roof over Blg L	Non-ACM	ND	--	--	Roof 3
Mastic on gray caulking	PMA-1	Roof over Blg L	Non-ACM	ND	--	--	around HVAC piping
Caulking associated with rooftop HVAC units	HC-1	Roof over Blg L	Non-ACM	ND	--	--	Roof 3
L1:Built up roofing 1/4"	RM-4	F-J Connector Bridge	Non-ACM	ND	--	--	Roof 4
L2: Tar paper under plywood			Non-ACM	ND	--	--	
Roof Flashing/Mastic	RF-2		Non-ACM	ND	--	--	
Pipe covering material under roof connector	PC-1		Non-ACM	ND	--	--	
L1: Built up roofing material 3/8"	RM-5	Roof over cafeteria	Non-ACM	ND	--	--	Roof 5
L2: 1/2" gypsum board			Non-ACM	ND	--	--	
L3: Felt paper under 6" foam insulation			Non-ACM	ND	--	--	
L4:Tar Paper/Mastic on Metal Deck			Non-ACM	ND	--	--	
Black material associated with silver lining	SDC-1		Non-ACM	ND	--	--	on fiberglass duct insulation/jacket
1/2" built up roofing under 1" gravel	RM-6	Canopy roof between Buildings F&K	Non-ACM	ND	--	--	Roof 6
L1: Built up roofing material 3/8" under 1.5" gravel	RM-7	Canopy roof by main entrance	Non-ACM	ND	--	--	Roof 7
L2: 1/8" roofing membrane under 2" pressed wood insulation on wood deck			Non-ACM	ND	--	--	
Roof Flashing/Mastic	RF-3		Non-ACM	ND	--	--	

Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Material	Sample ID	Location	Survey Results		Estimated Quantity of ACM		Notes/Comments
L1: Built up roofing material 1/4" under 1.5" gravel	RM-8	Canopy roof by audtitorium (Blg B)	Non-ACM	ND	--	--	Roof 8
L2: Felt paper under 4" pressed foam insulation on wood deck			Non-ACM	ND	--	--	
Counter Flash Caulking	CFC-1	Canopy roof by gym (blg A)	Non-ACM	ND	--	--	Roof 9
L1: Built up roofing material 1/2" under 1.5" gravel	RM-9		Non-ACM	ND	--	--	
L2: 1/2" gypsum board			Non-ACM	ND	--	--	
L3:Felt paper under 2" pressed foam insulation on wood deck			Non-ACM	ND	--	--	
Roof Flashing/Mastic	RF-4		Non-ACM	ND	--	--	

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
1	Calibration					1		
2	Calibration					1		
3	Calibration					1		
4	Door	Metal	Gray	Interior	Food Stand	0.1	NEGATIVE	Fair
5	Door Frame	Metal	Gray	Interior	Food Stand	0	NEGATIVE	Fair
6	**Wall**	**Cinderblock**	**White**	**Interior**	**Food Stand**	**1.8**	**POSITIVE**	**Fair**
7	**Wall**	**Cinderblock**	**White**	**Interior**	**Food Stand**	**1.8**	**POSITIVE**	**Fair**
8	Wall	Cinderblock	White	Interior	Food Stand	0.1	NEGATIVE	Fair
9	Shutter Door	Metal	White	Interior	Food Stand	0.1	NEGATIVE	Fair
10	Shutter Door Frame	Metal	White	Interior	Food Stand	0	NEGATIVE	Fair
11	Wall	Plaster	Gray	Exterior	Food Stand	0.2	NEGATIVE	Fair
12	Wall	Plaster	Gray	Exterior	Food Stand	0.3	NEGATIVE	Fair
13	Wall	Plaster	Gray	Exterior	Food Stand	0.4	NEGATIVE	Fair
14	**Wall**	**Wood**	**White**	**Exterior**	**Food Stand**	**1.1**	**POSITIVE**	**Fair**
15	Wall	Wood	White	Exterior	Food Stand	0.8	NEGATIVE	Fair
16	Wall	Plaster	Gray	Exterior	Telescope Building	0.1	NEGATIVE	Fair
17	Wall	Plaster	Gray	Exterior	Telescope Building	0.2	NEGATIVE	Fair
18	Wall	Plaster	Gray	Exterior	Telescope Building	0.3	NEGATIVE	Fair
19	Dome	Metal	Brown	Exterior	Telescope Building	0	NEGATIVE	Fair
20	Dome	Metal	Brown	Exterior	Telescope Building	0.1	NEGATIVE	Fair
21	Door	Metal	Gray	Exterior	Telescope Building	0.1	NEGATIVE	Fair
22	Door Frame	Metal	Gray	Exterior	Telescope Building	-0.2	NEGATIVE	Fair
23	Wall	Cinderblock	White	Interior	Telescope Building	0.2	NEGATIVE	Fair
24	Wall	Cinderblock	White	Interior	Telescope Building	0.3	NEGATIVE	Fair
25	Wall	Cinderblock	White	Interior	Telescope Building	0.2	NEGATIVE	Fair
26	Wall	Gypsum Board	White	Interior	Telescope Building	0.2	NEGATIVE	Fair
27	Wall	Gypsum Board	White	Interior	Telescope Building	0.1	NEGATIVE	Fair
28	Floor	Concrete	Gray	Interior	Telescope Building	0.1	NEGATIVE	Fair
29	Column Base	Plaster	White	Interior	Telescope Building	0.2	NEGATIVE	Fair
30	Bollard	Metal	Yellow	Exterior	Telescope Building	-0.2	NEGATIVE	Fair
31	Bollard	Metal	Yellow	Exterior	Telescope Building	-0.2	NEGATIVE	Fair
32	Wall	Cinderblock	Gray	Interior	School Building A	0.7	NEGATIVE	Fair
33	Wall	Gypsum Board	Gray	Interior	School Building A	0.2	NEGATIVE	Fair
34	Ceiling	Gypsum Board	White	Interior	School Building A	0.1	NEGATIVE	Fair
35	Wall	Cinderblock	Gray	Interior	School Building A	0.7	NEGATIVE	Fair
36	Wall	Cinderblock	Gray	Interior	School Building A	0.1	NEGATIVE	Fair
37	Wall	Gypsum Board	Dark Gray	Interior	School Building A	0.3	NEGATIVE	Fair
38	Wall	Gypsum Board	Gray	Interior	School Building A	0.2	NEGATIVE	Fair
39	Ceiling	Gypsum Board	White	Interior	School Building A	0.1	NEGATIVE	Fair
40	Wall	Cinderblock	Gray	Interior	School Building A	0.1	NEGATIVE	Fair
41	Wall	Gypsum Board	Gray	Interior	School Building A	0.5	NEGATIVE	Fair
42	Ceiling	Gypsum Board	White	Interior	School Building A	0.1	NEGATIVE	Fair
43	Wall	Gypsum Board	Gray	Interior	School Building A	0	NEGATIVE	Fair
44	Ceiling	Gypsum Board	White	Interior	School Building A	0.1	NEGATIVE	Fair
45	Wall	Gypsum Board	Gray	Interior	School Building A	0.2	NEGATIVE	Fair
46	Wall	Brick	Gray	Interior	School Building A	0.1	NEGATIVE	Fair
47	Wall	Plaster	White	Interior	School Building A	0.2	NEGATIVE	Fair
48	Wall	Brick	Gray	Interior	School Building A	0	NEGATIVE	Fair
49	Wall	Cinderblock	Gray	Interior	School Building A	0.5	NEGATIVE	Fair
50	Wall	Cinderblock	White	Interior	School Building A	0.2	NEGATIVE	Fair
51	Wall	Cinderblock	Orange	Interior	School Building A	0.4	NEGATIVE	Fair

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
52	Wall	Cinderblock	Gray	Interior	School Building A	0.2	NEGATIVE	Fair
53	Wall	Brick	Gray	Interior	School Building A	0.1	NEGATIVE	Fair
54	**Wall**	**Cinderblock**	**Dark Orange**	**Interior**	**School Building A (Gym Mechanical Room)**	**1.4**	**POSITIVE**	**Fair**
55	**Wall**	**Cinderblock**	**Dark Orange**	**Interior**	**School Building A (Gym Mechanical Room)**	**1.3**	**POSITIVE**	**Fair**
56	**Wall**	**Brick (Big)**	**Gray**	**Interior**	**School Building A (Main Gym)**	**1.2**	**POSITIVE**	**Fair**
57	**Wall**	**Brick (Big)**	**Gray**	**Interior**	**School Building A (Main Gym)**	**1**	**POSITIVE**	**Fair**
58	Wall	Gypsum Board	White	Interior	School Building B	0.2	NEGATIVE	Fair
59	Ceiling	Gypsum Board	White	Interior	School Building B	0.3	NEGATIVE	Fair
60	Wall	Cinderblock	White	Interior	School Building B	0.3	NEGATIVE	Fair
61	Wall	Cinderblock	White	Interior	School Building B	0.3	NEGATIVE	Fair
62	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building B (Auditorium Side Hallway**	**1.1**	**POSITIVE**	**Fair**
63	Wall	Cinderblock	White	Interior	School Building B (Auditorium Side Hallway	0.9	NEGATIVE	Fair
64	Wall	Gypsum Board	White	Interior	School Building B	0.2	NEGATIVE	Fair
65	Wall	Gypsum Board	Gray	Interior	School Building B	0.4	NEGATIVE	Fair
66	Wall	Cinderblock	Beige	Interior	School Building B	0.2	NEGATIVE	Fair
67	Wall	Cinderblock	Black	Interior	School Building B (Auditorium Stage)	0.7	NEGATIVE	Fair
68	**Wall**	**Cinderblock**	**Black**	**Interior**	**School Building B (Auditorium Stage)**	**2.1**	**POSITIVE**	**Fair**
69	Calibration					1		
70	Calibration					0.9		
71	Calibration					1		
72	Calibration					0.9		
73	Calibration					1		
74	Calibration					0.9		
75	Wall	Gypsum Board	Dark Gray	Interior	School Building B	0.1	NEGATIVE	Fair
76	Wall	Gypsum Board	Gray	Interior	School Building B	0.2	NEGATIVE	Fair
77	Wall	Gypsum Board	White	Interior	School Building B	0.2	NEGATIVE	Fair
78	Wall	Cinderblock	White	Interior	School Building C	0.3	NEGATIVE	Fair
79	Wall	Gypsum Board	White	Interior	School Building C	0.5	NEGATIVE	Fair
80	Wall	Gypsum Board	White	Interior	School Building C	0.2	NEGATIVE	Fair
81	Soffit Ceiling	Gypsum Board	White	Interior	School Building C	0.1	NEGATIVE	Fair
82	Wall	Cinderblock	Gray	Interior	School Building C	0.2	NEGATIVE	Fair
83	**Wall**	**Cinderblock**	**Blue**	**Interior**	**School Building C - Classroom C4**	**4**	**POSITIVE**	**Fair**
84	**Wall**	**Cinderblock**	**Blue**	**Interior**	**School Building C - Classroom C4**	**3.6**	**POSITIVE**	**Fair**
85	Wall	Gypsum Board	Blue	Interior	School Building C	0.2	NEGATIVE	Fair
86	Wall	Cinderblock	White	Interior	School Building C	0.3	NEGATIVE	Fair
87	Wall	Gypsum Board	White	Interior	School Building C	0.2	NEGATIVE	Fair
88	Wall	Gypsum Board	White	Interior	School Building C	0.2	NEGATIVE	Fair
89	Wall	Gypsum Board	Gray	Interior	School Building D	0.2	NEGATIVE	Fair
90	Wall	Gypsum Board	White	Interior	School Building D	0.2	NEGATIVE	Fair
91	Wall	Gypsum Board	White	Interior	School Building D	0.3	NEGATIVE	Fair
92	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building D - Room D5**	**2.6**	**POSITIVE**	**Fair**
93	Wall	Cinderblock	Yellow	Interior	School Building D	-0.1	NEGATIVE	Fair

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
94	Wall	Gypsum Board	Yellow	Interior	School Building D	0.2	NEGATIVE	Fair
95	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building D - Room D1**	**1.3**	**POSITIVE**	**Fair**
96	Wall	Gypsum Board	White	Interior	School Building D	0.1	NEGATIVE	Fair
97	Ceiling	Gypsum Board	White	Interior	School Building D	0.2	NEGATIVE	Fair
98	Ceiling	Gypsum Board	White	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
99	Wall	Gypsum Board	White	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
100	Wall	Gypsum Board	Yellow	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
101	Wall	Gypsum Board	Yellow	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
102	Wall	Gypsum Board	White	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
103	Wall	Cinderblock	Orange	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
104	Wall	Gypsum Board	Blue	Interior	School Building L - 2nd Floor	0.1	NEGATIVE	Fair
105	Wall	Gypsum Board	White	Interior	School Building L - 2nd Floor	-0.1	NEGATIVE	Fair
106	Wall	Gypsum Board	White	Interior	School Building L - 2nd Floor	0.1	NEGATIVE	Fair
107	Wall	Cinderblock	Orange	Interior	School Building L - 2nd Floor	0	NEGATIVE	Fair
108	Wall	Cinderblock	Orange	Interior	School Building L - 2nd Floor	0	NEGATIVE	Fair
109	Wall	Cinderblock	White	Interior	School Building L - 2nd Floor	0.2	NEGATIVE	Fair
110	Wall	Cinderblock	White	Interior	School Building L - 1st Floor	0.1	NEGATIVE	Fair
111	Wall	Cinderblock	White	Interior	School Building L - 1st Floor	0.3	NEGATIVE	Fair
112	Wall	Cinderblock	Orange	Interior	School Building L - 1st Floor	0.2	NEGATIVE	Fair
113	Wall	Cinderblock	Orange	Interior	School Building L - 1st Floor	0.2	NEGATIVE	Fair
114	Wall	Gypsum Board	White	Interior	School Building L - 1st Floor	0.2	NEGATIVE	Fair
115	Wall	Gypsum Board	Blue	Interior	School Building L - 1st Floor	0.1	NEGATIVE	Fair
116	Wall	Gypsum Board	Blue	Interior	School Building L - 1st Floor	0.2	NEGATIVE	Fair
117	Wall	Cinderblock	White	Interior	School Building L - 1st Floor	0.1	NEGATIVE	Fair
118	Wall	Cinderblock	White	Interior	School Building L - 1st Floor	0.4	NEGATIVE	Fair
119	Wall	Gypsum Board	White	Interior	School Building L - 1st Floor	0.1	NEGATIVE	Fair
120	Wall	Cinderblock	Blue	Interior	School Building L - 1st Floor	0.2	NEGATIVE	Fair
121	Wall	Gypsum Board	White	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair
122	Wall	Gypsum Board	White	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair
123	Wall	Gypsum Board	Blue	Interior	School Building J - 1st Floor	0.3	NEGATIVE	Fair
124	Wall	Gypsum Board	White	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair
125	Wall	Gypsum Board	White	Interior	School Building J - 1st Floor	0.3	NEGATIVE	Fair
126	Wall	Gypsum Board	Orange	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair
127	Wall	Gypsum Board	White	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
128	Wall	Gypsum Board	Green	Interior	School Building J - 1st Floor	0.2	NEGATIVE	Fair
129	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
130	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
131	Wall	Gypsum Board	Gray	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
132	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
133	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
134	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
135	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.2	NEGATIVE	Fair
136	Wall	Gypsum Board	White	Interior	School Building J - 2nd Floor	0.3	NEGATIVE	Fair
137	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.2	NEGATIVE	Fair
138	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	-0.1	NEGATIVE	Fair
139	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.1	NEGATIVE	Fair
140	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.5	NEGATIVE	Fair
141	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.3	NEGATIVE	Fair
142	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.1	NEGATIVE	Fair
143	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.1	NEGATIVE	Fair
144	Wall	Gypsum Board	White	Interior	School Building K - 2nd Floor	0.4	NEGATIVE	Fair
145	Wall	Gypsum Board	White	Interior	School Building K - 1st Floor	0.2	NEGATIVE	Fair
146	Wall	Gypsum Board	White	Interior	School Building K - 1st Floor	0.3	NEGATIVE	Fair
147	Wall	Gypsum Board	White	Interior	School Building K - 1st Floor	0.3	NEGATIVE	Fair
148	Wall	Gypsum Board	White	Interior	School Building K - 1st Floor	0.1	NEGATIVE	Fair
149	Wall	Gypsum Board	Blue	Interior	School Building K - 1st Floor	0.1	NEGATIVE	Fair
150	Wall	Gypsum Board	Blue	Interior	School Building K - 1st Floor	0.3	NEGATIVE	Fair
151	Wall	Gypsum Board	Gray	Interior	School Building G	0.2	NEGATIVE	Fair
152	Wall	Gypsum Board	White	Interior	School Building G	-0.1	NEGATIVE	Fair
153	Wall	Gypsum Board	Gray	Interior	School Building G	0.2	NEGATIVE	Fair
154	Wall	Gypsum Board	Orange	Interior	School Building G	-0.1	NEGATIVE	Fair
155	Wall	Gypsum Board	White	Interior	School Building G	-0.1	NEGATIVE	Fair
156	Wall	Gypsum Board	Gray	Interior	School Building G	0.2	NEGATIVE	Fair
157	Wall	Gypsum Board	Gray	Interior	School Building G	0.2	NEGATIVE	Good
158	Wall	Cinderblock	White	Interior	School Building G	0.8	NEGATIVE	Good
159	Wall	Cinderblock	White	Interior	School Building G	0.7	NEGATIVE	Good
160	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building G - Hallway by Art Office**	**7.1**	**POSITIVE**	**Good**
161	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building G - Hallway by Art Office**	**6.5**	**POSITIVE**	**Good**
162	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building G - Hallway by Art Office**	**2.2**	**POSITIVE**	**Good**
163	Wall	Gypsum Board	White	Interior	School Building G	0.2	NEGATIVE	Good

Table 2 - XRF SCREENING RESULTS (LIMITED BUILDING AREAS SURVEYED)
Horace Greeley High School Capital Improvements Project

Reading ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments/Condition
				Floor	Area			
164	**Wall**	**Cinderblock**	**White**	**Interior**	**School Building G - Studio 1**	**3.5**	**POSITIVE**	**Good**
165	Wall	Gypsum Board	White	Interior	School Building G	0.3	NEGATIVE	Good
166	Wall	Gypsum Board	White	Interior	School Building F	0.2	NEGATIVE	Good
167	Wall	Gypsum Board	Gray	Interior	School Building F	0.2	NEGATIVE	Good
168	Wall	Gypsum Board	Blue	Interior	School Building F	0.2	NEGATIVE	Fair
169	Wall	Gypsum Board	Blue	Interior	School Building F	0.2	NEGATIVE	Fair
170	Wall	Gypsum Board	Orange	Interior	School Building F	0.2	NEGATIVE	Good
171	Wall	Gypsum Board	White	Interior	School Building F	0.2	NEGATIVE	Good
172	**Wall**	**Gypsum Board**	**Blue**	**Interior**	**School Building F - Room F1**	**1.8**	**POSITIVE**	**Good**
173	Wall	Gypsum Board	White	Interior	School Building F	0.5	NEGATIVE	Good
174	Ceiling	Gypsum Board	White	Interior	School Building F	0.2	NEGATIVE	Fair
175	Wall	Gypsum Board	White	Interior	School Building E	0.2	NEGATIVE	Fair
176	**Wall**	**Cinderblock**	**Blue**	**Interior**	**School Building E - Room E1**	**3.8**	**POSITIVE**	**Good**
177	Wall	Gypsum Board	Blue	Interior	School Building E	0	NEGATIVE	Good
178	Wall	Cinderblock	White	Interior	School Building E	0.7	NEGATIVE	Good
179	Wall	Gypsum Board	Green	Interior	School Building E	0.2	NEGATIVE	Good
180	Wall	Gypsum Board	Green	Interior	School Building E	0.2	NEGATIVE	Good
181	Wall	Gypsum Board	Green	Interior	School Building E	0.3	NEGATIVE	Good
182	Wall	Gypsum Board	Blue	Interior	School Building E	0.3	NEGATIVE	Fair
183	Wall	Gypsum Board	Yellow	Interior	School Building E	0.1	NEGATIVE	Fair
184	Wall	Gypsum Board	Orange	Interior	School Building E	0.1	NEGATIVE	Fair
185	Wall	Gypsum Board	Beige	Interior	School Building E	0.3	NEGATIVE	Fair
186	Wall	Gypsum Board	White	Interior	School Building E	0.1	NEGATIVE	Fair
187	Wall	Gypsum Board	White	Interior	School Building H	0.2	NEGATIVE	Fair
188	Wall	Gypsum Board	Gray	Interior	School Building H	0.2	NEGATIVE	Fair
189	Wall	Gypsum Board	Gray	Interior	School Building H	0.1	NEGATIVE	Fair
190	Ceiling	Gypsum Board	Gray	Interior	School Building H	0.1	NEGATIVE	Fair
191	Wall	Cinderblock	Gray	Interior	School Building H	0.1	NEGATIVE	Fair
192	Wall	Cinderblock	Gray	Interior	School Building H	0.1	NEGATIVE	Fair
193	Wall	Gypsum Board	White	Interior	School Building H	0.2	NEGATIVE	Fair
194	Wall	Gypsum Board	Gray	Interior	School Building H	0.2	NEGATIVE	Fair
195	Wall	Gypsum Board	Orange	Interior	School Building H	0.1	NEGATIVE	Fair
196	Wall	Gypsum Board	White	Interior	School Building H	0.4	NEGATIVE	Fair
197	Wall	Gypsum Board	White	Interior	School Building H	0.3	NEGATIVE	Fair
198	Calibration					0.9		
199	Calibration					1		
200	Calibration					1		

Note: Although Langan recognizes that the EPA definition of LBP is only applicable to certain residential and child-occupied structures, we are using the EPA LBP definition as a threshold for reporting. OSHA regulates disturbances and employee exposures to any detectable concentration of lead.

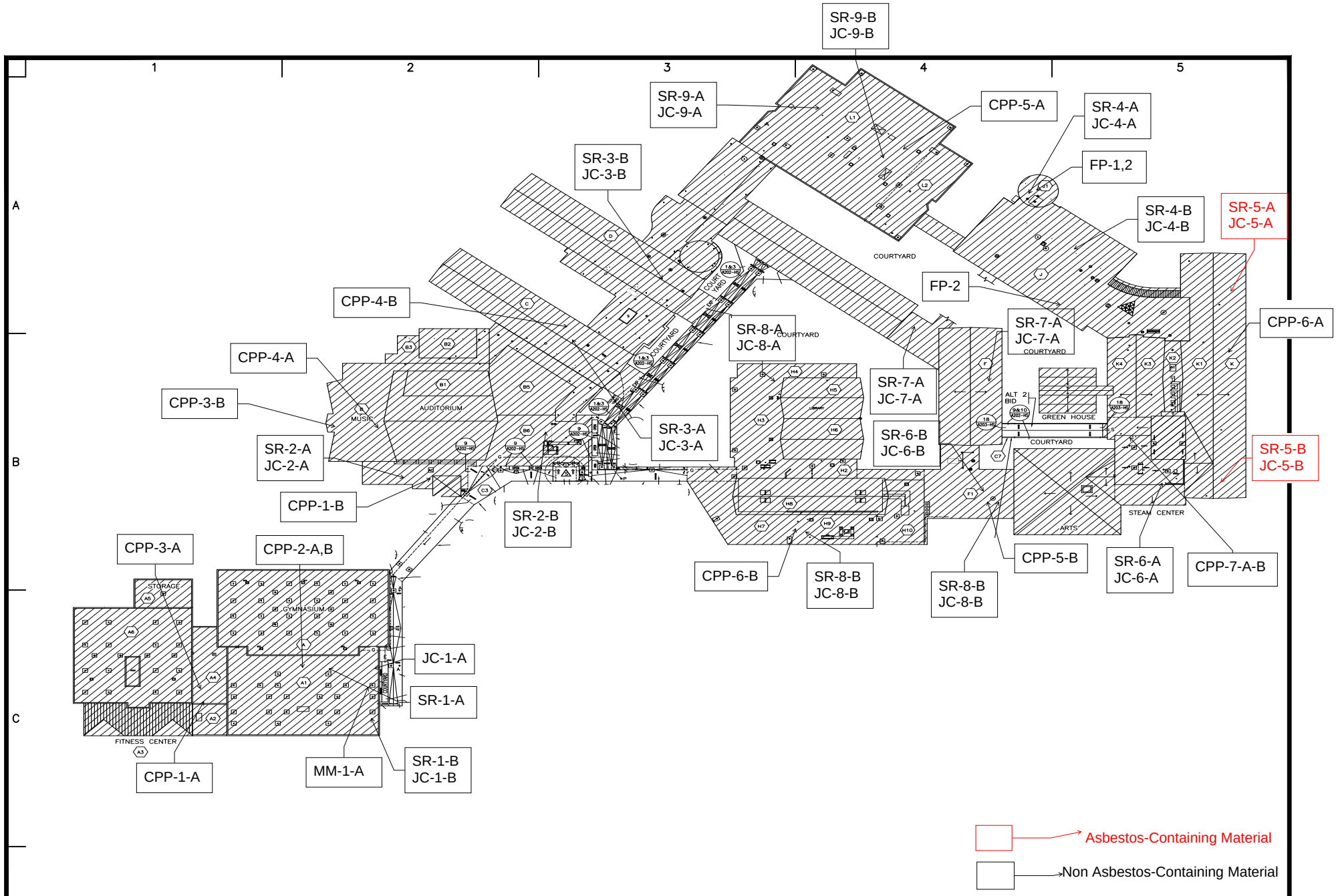
NEGATIVE	= Negative Lead Result
POSITIVE	= Positive for lead-based paint as defined under 40 CFR Part 745.

Table 3 - SUMMARY OF CAULK SAMPLE PCB ANALYSES RESULTS
Horace Greeley High School Capital Improvements Project

ND or <50000//50 [µg/Kg]//[PPM] ---------- = Non-PCB
>50000//50 [µg/Kg]//[PPM] ---------- **= PCB Containing**

Material	Sample ID #	Sample Location	Parameter	Results	Units	Reporting Level	Approximate Quantities, Locations of PCB Caulk / Comments
Caulking Assoicated with Doors	DC-1	Telescope Building-Perimeter Walls	PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Caulking Associated with metal sheets/joints around the dome	MSC-1	Telescope Building-Dome Interior/Exterior	PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Caulking associated with HVAC units on Roof	HC-1	Roof 3, Roof Over Building L	PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
Caulking associated with metal counter flashing	CFC-1	Roof 9-Canopy Roof by Building A	PCB-1016	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	---
			PCB-1221	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1232	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1242	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1248	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1254	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1260	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1262	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	
			PCB-1268	0 // ND	[µg/Kg]//[PPM]	990 // 1.0	

FIGURES



GENERAL NOTES:

A. THIS PLAN IS PROVIDED TO SHOW APPROXIMATE SAMPLING LOCATIONS. THE ACTUAL LAYOUT OF THE BUILDING AND BUILDING EQUIPMENT MAY BE SLIGHTLY DIFFERENT THAN SHOWN.

LANGAN
Langan Engineering and Environmental Services, Inc.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ Certificate of Authorization No.24GA27996400

Project
Horace Greeley HS
Capital Improvements Project

Drawing Title
ASBESTOS SAMPLING LOCATIONS
Interior

Project No.	101061220
Date	10/25/2023
Drawn By	
Checked By	

Drawing No.
ASL-01
Sheet 1 of 3

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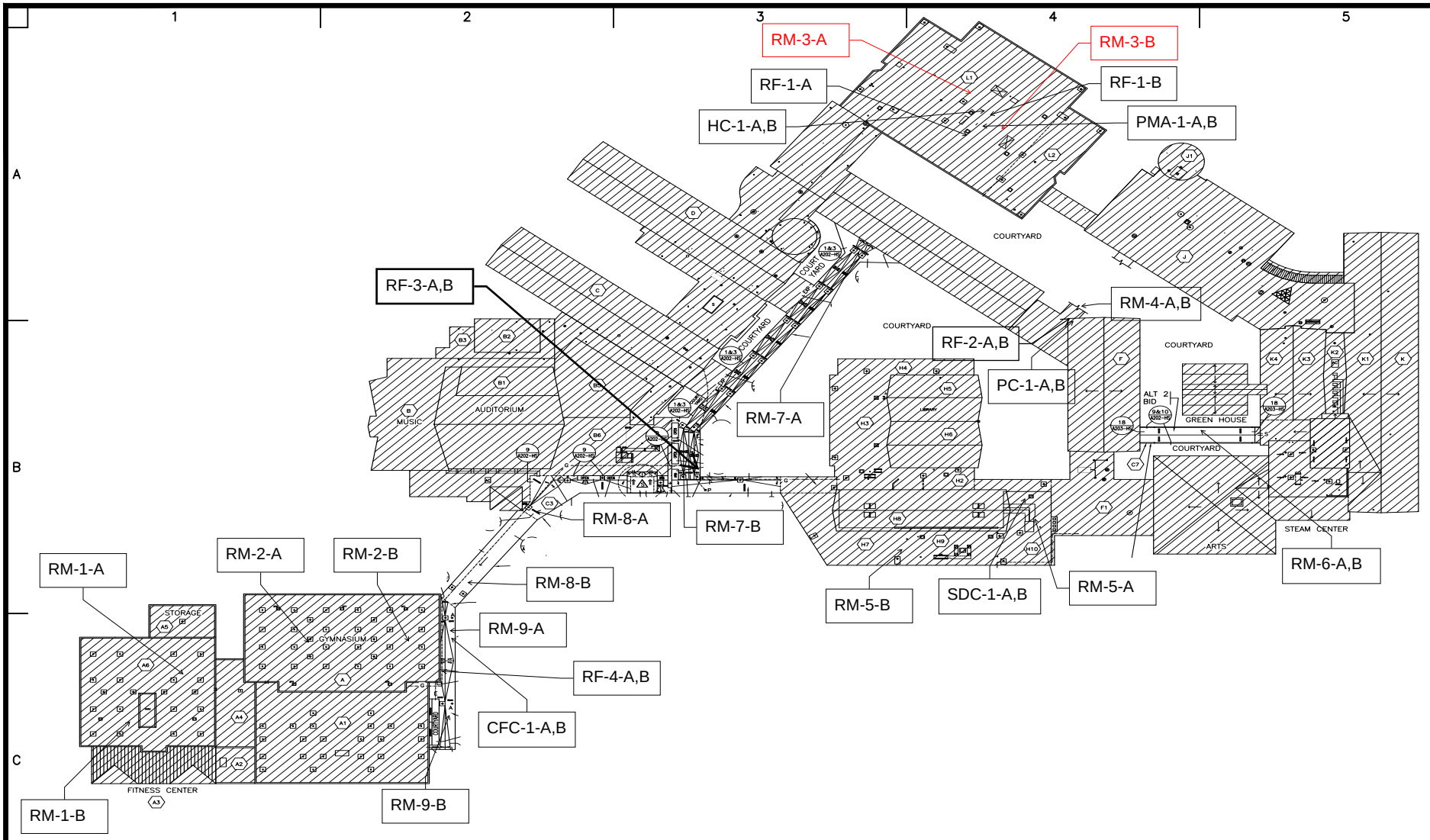

GENERAL NOTES:

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Project

Horace Greeley HS Capital Improvements Project

Drawing Title

ASBESTOS SAMPLING
Roofing Locations

Project No.	101061220
Date	10/25/2023
Drawn By	
Checked By	

Drawing No. **ASL-02**

Sheet 2 of 3

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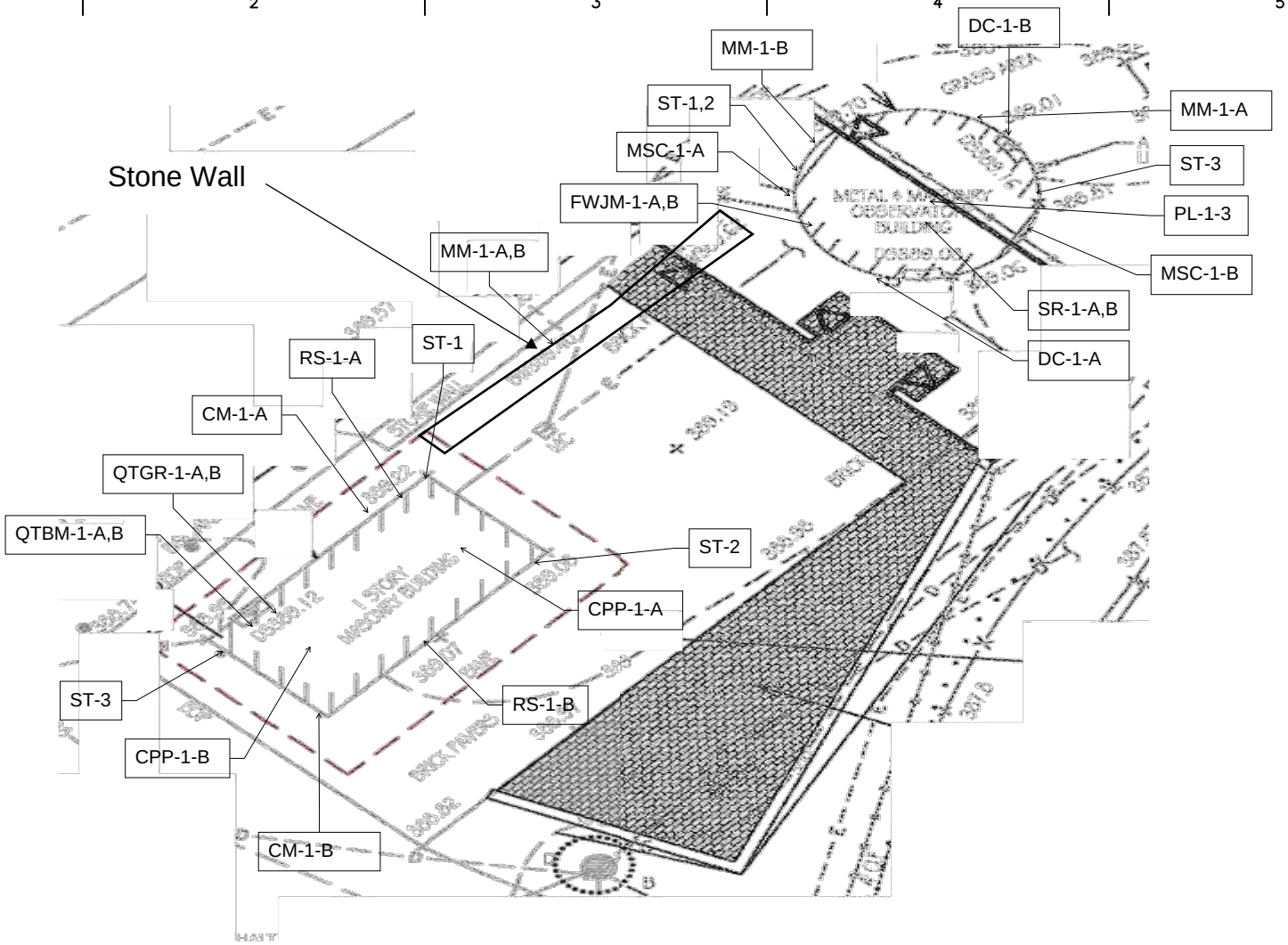

GENERAL NOTES:

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Project
Horace Greeley HS Capital Improvements Project

Drawing Title
ASBESTOS SAMPLING
Observatory/Snack Bar

Project No. 101061220
Date 10/25/2023
Drawn By
Checked By

Drawing No.
ASL-03
Sheet 3 of 3

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A P P E N D I X A

Laboratory Test Results and Chain of Custody Documentations (Asbestos)

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/19/23
Date Examined 10/20/23
ELAP # 11480

AmeriSci Job # 223102579
P.O. #
Page 1 **of** 10

RE: 101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MM-1-A MM1	223102579-01 **Location:** Building A - Masonry Mortar	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23

Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material
Asbestos Types:
Other Material: Cellulose Trace, Non-fibrous 100%

MM-1-B MM1	223102579-02 **Location:** Building F - Masonry Mortar	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23

Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material
Asbestos Types:
Other Material: Cellulose Trace, Non-fibrous 100%

FP-1 FP	223102579-03 **Location:** Building J - 2nd Floor - Spray-On Fireproofing Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23

Analyst Description: Gray, Homogeneous, Fibrous, Bulk Material
Asbestos Types:
Other Material: Cellulose Trace, Fibrous glass 65%, Non-fibrous 35%

FP-2 FP	223102579-04 **Location:** Building J - 2nd Floor - Spray-On Fireproofing Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23

Analyst Description: Gray, Homogeneous, Fibrous, Bulk Material
Asbestos Types:
Other Material: Cellulose Trace, Fibrous glass 60%, Non-fibrous 40%

FP-3 FP	223102579-05 **Location:** Building J - 1st Floor - Spray-On Fireproofing Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23

Analyst Description: Gray, Homogeneous, Fibrous, Bulk Material
Asbestos Types:
Other Material: Cellulose Trace, Fibrous glass 65%, Non-fibrous 35%

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SR-1-A SR1	223102579-06 **Location:** Building A - Janitor's Closet - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 15%, Fibrous glass 1%, Non-fibrous 84%			
SR-1-B SR1	223102579-07 **Location:** Building A - Mechanical Room - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-1-A JC1	223102579-08 **Location:** Building A - Janitor's Closet - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
JC-1-B JC1	223102579-09 **Location:** Building A - Mechanical Room - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
SR-2-A SR2	223102579-10 **Location:** Building B - Copy Room - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 15%, Fibrous glass Trace, Non-fibrous 85%			
SR-2-B SR2	223102579-11 **Location:** Building B - Closet Office - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-2-A JC2	223102579-12 **Location:** Building B - Copy Room - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-2-B JC2	223102579-13 **Location:** Building B - Closet Office - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
SR-3-A SR3	223102579-14 **Location:** Building C - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 12%, Fibrous glass Trace, Non-fibrous 88%			
SR-3-B SR3	223102579-15 **Location:** Building D - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			
JC-3-A JC3	223102579-16 **Location:** Building C - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-3-B JC3	223102579-17 **Location:** Building D - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SR-4-A SR4	223102579-18 **Location:** Building J - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			
SR-4-B SR4	223102579-19 **Location:** Building J - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			
JC-4-A JC4	223102579-20 **Location:** Building J - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-4-B JC4	223102579-21 **Location:** Building J - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
SR-5-A SR5	223102579-22 **Location:** Building K - 1st Floor - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Non-fibrous 90%			
SR-5-B SR5	223102579-23 **Location:** Building K - 2nd Floor - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Off White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 7%, Fibrous glass Trace, Non-fibrous 93%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-5-A JC5	223102579-24 **Location:** Building K - 1st Floor - Gypsum Board Joint Compound	***Yes***	0.5% (ELAP 400 PC) by Valeriu Voicu on 10/20/23
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 0.5 % **Other Material:** Non-fibrous 99.5%			
JC-5-B JC5	223102579-25 **Location:** Building K - 2nd Floor - Gypsum Board Joint Compound	***Yes***	1.5% (ELAP 400 PC) by Valeriu Voicu on 10/20/23
Analyst Description: Beige, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.5 % **Other Material:** Cellulose Trace, Non-fibrous 98.5%			
SR-6-A SR6	223102579-26 **Location:** Building G - Lab - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 15%, Fibrous glass 1%, Non-fibrous 84%			
SR-6-B SR6	223102579-27 **Location:** Building G - Electrical Closet - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 3%, Fibrous glass 1%, Non-fibrous 96%			
JC-6-A JC6	223102579-28 **Location:** Building G - Lab - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-6-B JC6	223102579-29 **Location:** Building G - Electrical Closet - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SR-7-A SR7	223102579-30 **Location:** Building F - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10%, Fibrous glass Trace, Non-fibrous 90%			
SR-7-B SR7	223102579-31 **Location:** Building E - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 12%, Fibrous glass Trace, Non-fibrous 88%			
JC-7-A JC7	223102579-32 **Location:** Building F - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-7-B JC7	223102579-33 **Location:** Building E - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
SR-8-A SR8	223102579-34 **Location:** Building H - Library - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 20%, Non-fibrous 80%			
SR-8-B SR8	223102579-35 **Location:** Building H - Cafeteria - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 30%, Non-fibrous 70%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
JC-8-A JC8	223102579-36 **Location:** Building H - Library - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-8-B JC8	223102579-37 **Location:** Building H - Cafeteria - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
CPP-1-A CPP1	223102579-38 **Location:** Building A - 2' x 2' With Small Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 33.1%			
CPP-1-B CPP1	223102579-39 **Location:** Building C - 2' x 2' With Small Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 43.2%			
CPP-2-A CPP2	223102579-40 **Location:** Building A - Gym Storage Room - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Beige, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.9%			
CPP-2-B CPP2	223102579-41 **Location:** Building A - Gym Storage Room - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.2%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CPP-3-A CPP3	223102579-42 **Location:** Building A - Office - 2' x 4' With Small Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 36.6%			
CPP-3-B CPP3	223102579-43 **Location:** Building A - Office - 2' x 4' With Small Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 26.8%			
CPP-4-A CPP4	223102579-44 **Location:** Building B - Music Room Office - 2' x 4 ' With Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 28.5%			
CPP-4-B CPP4	223102579-45 **Location:** Building C - Classroom 3 - 2' x 4 ' With Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 26.4%			
CPP-5-A CPP5	223102579-46 **Location:** Building L - Basement Level - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 43.5%			
CPP-5-B CPP5	223102579-47 **Location:** Building G - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 45.9%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CPP-6-A CPP6	223102579-48 **Location:** Building K - Hallway 2nd Floor - Various Size Gypsum Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.8%			
CPP-6-B CPP6	223102579-49 **Location:** Building H - Cafeteria Kitchen - Various Size Gypsum Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/White, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 26.8%			
CPP-7-A CPP7	223102579-50 **Location:** Hallway Between Buildings F & K - 2' x 4'' With 6-Inche Wide Stripes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 23.7%			
CPP-7-B CPP7	223102579-51 **Location:** Building G - 2' x 4'' With 6-Inche Wide Stripes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 23.5%			
CPP-8-A CPP8	223102579-52 **Location:** Studio 1 - Building G - 2' x 4' With Big Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 56.4%			
CPP-8-B CPP8	223102579-53 **Location:** Studio 1 - Building G - 2' x 4' With Big Grooves And Pin Holes Ceiling Panel	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 60.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

Reporting Notes:

Analyzed by: Valeriu Voicu
Date: 10/20/2023

Reviewed by: Marik Peysakhov

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	MM-1-A	MM1	----	----	----	----	NAD	NA
Location:	Building A - Masonry Mortar							
02	MM-1-B	MM1	----	----	----	----	NAD	NA
Location:	Building F - Masonry Mortar							
03	FP-1	FP	----	----	----	----	NAD	NA
Location:	Building J - 2nd Floor - Spray-On Fireproofing Insulation							
04	FP-2	FP	----	----	----	----	NAD	NA
Location:	Building J - 2nd Floor - Spray-On Fireproofing Insulation							
05	FP-3	FP	----	----	----	----	NAD	NA
Location:	Building J - 1st Floor - Spray-On Fireproofing Insulation							
06	SR-1-A	SR1	----	----	----	----	NAD	NA
Location:	Building A - Janitor's Closet - Gypsum Board							
07	SR-1-B	SR1	----	----	----	----	NAD	NA
Location:	Building A - Mechanical Room - Gypsum Board							
08	JC-1-A	JC1	----	----	----	----	NAD	NA
Location:	Building A - Janitor's Closet - Gypsum Board Joint Compound							
09	JC-1-B	JC1	----	----	----	----	NAD	NA
Location:	Building A - Mechanical Room - Gypsum Board Joint Compound							
10	SR-2-A	SR2	----	----	----	----	NAD	NA
Location:	Building B - Copy Room - Gypsum Board							
11	SR-2-B	SR2	----	----	----	----	NAD	NA
Location:	Building B - Closet Office - Gypsum Board							
12	JC-2-A	JC2	----	----	----	----	NAD	NA
Location:	Building B - Copy Room - Gypsum Board Joint Compound							
13	JC-2-B	JC2	----	----	----	----	NAD	NA
Location:	Building B - Closet Office - Gypsum Board Joint Compound							
14	SR-3-A	SR3	----	----	----	----	NAD	NA
Location:	Building C - Gypsum Board							
15	SR-3-B	SR3	----	----	----	----	NAD	NA
Location:	Building D - Gypsum Board							
16	JC-3-A	JC3	----	----	----	----	NAD	NA
Location:	Building C - Gypsum Board Joint Compound							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	JC-3-B	JC3	----	----	----	----	NAD	NA
Location: Building D - Gypsum Board Joint Compound								
18	SR-4-A	SR4	----	----	----	----	NAD	NA
Location: Building J - Gypsum Board								
19	SR-4-B	SR4	----	----	----	----	NAD	NA
Location: Building J - Gypsum Board								
20	JC-4-A	JC4	----	----	----	----	NAD	NA
Location: Building J - Gypsum Board Joint Compound								
21	JC-4-B	JC4	----	----	----	----	NAD	NA
Location: Building J - Gypsum Board Joint Compound								
22	SR-5-A	SR5	----	----	----	----	NAD	NA
Location: Building K - 1st Floor - Gypsum Board								
23	SR-5-B	SR5	----	----	----	----	NAD	NA
Location: Building K - 2nd Floor - Gypsum Board								
24	JC-5-A	JC5	----	----	----	----	Chrysotile 0.5	NA
Location: Building K - 1st Floor - Gypsum Board Joint Compound								
25	JC-5-B	JC5	----	----	----	----	Chrysotile 1.5	NA
Location: Building K - 2nd Floor - Gypsum Board Joint Compound								
26	SR-6-A	SR6	----	----	----	----	NAD	NA
Location: Building G - Lab - Gypsum Board								
27	SR-6-B	SR6	----	----	----	----	NAD	NA
Location: Building G - Electrical Closet - Gypsum Board								
28	JC-6-A	JC6	----	----	----	----	NAD	NA
Location: Building G - Lab - Gypsum Board Joint Compound								
29	JC-6-B	JC6	----	----	----	----	NAD	NA
Location: Building G - Electrical Closet - Gypsum Board Joint Compound								
30	SR-7-A	SR7	----	----	----	----	NAD	NA
Location: Building F - Gypsum Board								
31	SR-7-B	SR7	----	----	----	----	NAD	NA
Location: Building E - Gypsum Board								
32	JC-7-A	JC7	----	----	----	----	NAD	NA
Location: Building F - Gypsum Board Joint Compound								

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	JC-7-B	JC7	----	----	----	----	NAD	NA
Location: Building E - Gypsum Board Joint Compound								
34	SR-8-A	SR8	----	----	----	----	NAD	NA
Location: Building H - Library - Gypsum Board								
35	SR-8-B	SR8	----	----	----	----	NAD	NA
Location: Building H - Cafeteria - Gypsum Board								
36	JC-8-A	JC8	----	----	----	----	NAD	NA
Location: Building H - Library - Gypsum Board Joint Compound								
37	JC-8-B	JC8	----	----	----	----	NAD	NA
Location: Building H - Cafeteria - Gypsum Board Joint Compound								
38	CPP-1-A	CPP1	0.064	21.3	45.7	33.1	NAD	NAD
Location: Building A - 2' x 2' With Small Pin Holes Ceiling Panel								
39	CPP-1-B	CPP1	0.067	22.1	34.7	43.2	NAD	NAD
Location: Building C - 2' x 2' With Small Pin Holes Ceiling Panel								
40	CPP-2-A	CPP2	0.130	31.8	40.3	27.9	NAD	NAD
Location: Building A - Gym Storage Room - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel								
41	CPP-2-B	CPP2	0.161	28.4	44.3	27.2	NAD	NAD
Location: Building A - Gym Storage Room - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel								
42	CPP-3-A	CPP3	0.140	22.0	41.3	36.6	NAD	NAD
Location: Building A - Office - 2' x 4' With Small Pin Holes Ceiling Panel								
43	CPP-3-B	CPP3	0.148	50.0	23.2	26.8	NAD	NAD
Location: Building A - Office - 2' x 4' With Small Pin Holes Ceiling Panel								
44	CPP-4-A	CPP4	0.079	27.0	44.6	28.5	NAD	NAD
Location: Building B - Music Room Office - 2' x 4 ' With Grooves And Pin Holes Ceiling Panel								
45	CPP-4-B	CPP4	0.109	24.3	49.3	26.4	NAD	NAD
Location: Building C - Classroom 3 - 2' x 4 ' With Grooves And Pin Holes Ceiling Panel								
46	CPP-5-A	CPP5	0.109	24.5	32.0	43.5	NAD	NAD
Location: Building L - Basement Level - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel								
47	CPP-5-B	CPP5	0.063	20.0	34.1	45.9	NAD	NAD
Location: Building G - 2' x 4' With Small Grooves And Pin Holes Ceiling Panel								
48	CPP-6-A	CPP6	0.063	72.2	24.0	3.8	NAD	NAD
Location: Building K - Hallway 2nd Floor - Various Size Gypsum Ceiling Panel								

See Reporting notes on last page

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	CPP-6-B	CPP6	0.137	21.5	51.6	26.8	NAD	NAD
Location:	Building H - Cafeteria Kitchen - Various Size Gypsum Ceiling Panel							
50	CPP-7-A	CPP7	0.172	13.4	62.9	23.7	NAD	NAD
Location:	Hallway Between Buildings F & K - 2' x 4" With 6-Inche Wide Stripes Ceiling Panel							
51	CPP-7-B	CPP7	0.163	11.7	64.7	23.5	NAD	NAD
Location:	Building G - 2' x 4" With 6-Inche Wide Stripes Ceiling Panel							
52	CPP-8-A	CPP8	0.128	26.2	17.4	56.4	NAD	NAD
Location:	Studio 1 - Building G - 2' x 4' With Big Grooves And Pin Holes Ceiling Panel							
53	CPP-8-B	CPP8	0.127	26.6	12.7	60.7	NAD	NAD
Location:	Studio 1 - Building G - 2' x 4' With Big Grooves And Pin Holes Ceiling Panel							

Analyzed by: Marik Peysakhov

Date: 10/20/2023

Reviewed by: Marik Peysakhov

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Lab 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
MM-1-A	Masonry mortar	Building A	X						
MM-1-B	Masonry mortar	Building F	X						
FP-1	Spray-on fireproofing insulation	Building J - 2nd floor	X						
FP-2	Spray-on fireproofing insulation	Building J - 2nd floor	X						
FP-3	Spray-on fireproofing insulation	Building J - 1st floor	X						
SR-1-A	Gypsum board	Building A - Janitor's closet	X						
SR-1-B	↓	Building A - Mechanical room	X						
JC-1-A	Gypsum board joint compound	Building A - Janitor's closet	X						
JC-1-B	↓	Building A - Mechanical room	X						

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X			

Total No. of Samples: 9

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/18/2023	FedEx 19:30		10/19/23	10:34
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102579

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

2 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
SR-2-A	Gypsum board	Building B - Copy room	X						
SR-2-B	↓	Building B - Closet Office	X						
JC-2-A	Gypsum board joint compound	Building B - Copy room	X						
JC-2-B	↓	Building B - Closet Office	X						
SR-3-A	Gypsum board	Building C	X						
SR-3-B	↓	Building D	X						
JC-3-A	Gypsum board joint compound	Building C	X						
JC-3-B	↓	Building D	X						
SR-4-A	Gypsum board	Building J	X						
SR-4-B	↓	↓	X						

Total No. of Samples: 10

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
		X			

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel SSPatel	10/18/2023	FedEx 19:30		10/19/23	10:34
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102579

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300 Kimball Drive
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Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

3 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
JC-4-A	Gypsum board joint compound	Building J	X						
JC-4-B	↓	↓	X						
SR-5-A	Gypsum board	Building K - 1st floor	X						
SR-5-B	↓	Building K - 2nd floor	X						
JC-5-A	Gypsum board joint compound	Building K - 1st floor	X						
JC-5-B	↓	Building K - 2nd floor	X						
SR-6-A	Gypsum board	Building G - Lab	X						
SR-6-B	↓	Building G - Electrical closet	X						
JC-6-A	Gypsum board joint compound	Building G - Lab	X						
JC-6-B	↓	Building G - Electrical closet	X						

Total No. of Samples: 10

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
		X			

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/18/2023	FedEx 19:30			
Company: **LANGAN**			Company: AmeriSci	10/19/23	10:34

Laboratory Name: AmeriSci, NY, NY

223102579

LANGAN
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Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

4 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
SR-7-A	Gypsum board	Building F	X						
SR-7-B	↓	Building E	X						
JC-7-A	Gypsum board joint compound	Building F	X						
JC-7-B	↓	Building E	X						
SR-8-A	Gypsum board	Building H - Library	X						
SR-8-B	↓	Basement - Cafeteria	X						
JC-8-A	Gypsum board joint compound	Building H - Library	X						
JC-8-B	↓	Basement - Cafeteria	X						
CPP-1-A	2'x2' with small pin holes ceiling panel	Building A		X	X				
CPP-1-B	↓	Building C		X	X				

Total No. of Samples: 6

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
		X			

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Sanjay Patel	Date:	Time:	Received by:	Date:	Time:
	SSPatel	10/18/2023	FedEx 19:30			
Company: **LANGAN**				Company:		

Laboratory Name: AmeriSci, NY, NY

223102579

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

5 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
CPP-2-A	2'x4' with small grooves and pin holes ceiling panel	Building A - Gym storage room		X	X				
CPP-2-B	↓	Building A - Gym storage room		X	X				
CPP-3-A	2'x4' with small pin holes ceiling panel	Building A - Office		X	X				
CPP-3-B	↓	Building A - Office		X	X				
CPP-4-A	2'x4' with grooves and pin holes ceiling panel	Building B - Music room office		X	X				
CPP-4-B	↓	Building C - Classroom 3		X	X				
CPP-5-A	2'x2' with small grooves and pin holes ceiling panel	Building L - Basement level		X	X				
CPP-5-B	↓	Building G		X	X				
CPP-6-A	Various size gypsum ceiling panel	Building K - Hallway - 2nd floor		X	X				
CPP-6-B	↓	Building H -c Cafeteria Kitchen		X	X				

Total No. of Samples: 10

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
		X			

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel SB Patel	10/18/2023	FedEx 19:30			
Company: **LANGAN**			Company: AmeriSci	10/19/23	10:34

Laboratory Name: AmeriSci, NY, NY

223102579

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

6 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/18/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216 Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
CPP-7-A	2'x4' with 6-inche wide stripes ceiling panel	Hallway between buildings F & K		X	X				
CPP-7-B	↓	Building G		X	X				
CPP-8-A	2'x4' with big grooves and pin holes ceiling panel	Studio 1 - Building G		X	X				
CPP-8-B	↓	↓		X	X				

Total No. of Samples: 4

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
		X			

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/18/2023	FedEx 19:30		10/19/23	10:34
Company: **LANGAN**			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102579

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/20/23
Date Examined 10/21/23
ELAP # 11480

AmeriSci Job # 223102681
P.O. #
Page 1 **of** 2

RE: 101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SR-9-A SR9	223102681-01 **Location:** Building L, Room L216, 2nd Floor - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 10/21/23
Analyst Description: Off-White/Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 5%, Fibrous glass 2%, Non-fibrous 93%			
SR-9-B SR9	223102681-02 **Location:** Building L, Studio L5, 1st Floor - Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 10/21/23
Analyst Description: Off-White/Brown, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 12%, Fibrous glass 2%, Non-fibrous 86%			
JC-9-A JC9	223102681-03 **Location:** Building L, Room L216, 2nd Floor - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 10/21/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			
JC-9-B JC9	223102681-04 **Location:** Building L, Studio L5, 1st Floor - Gypsum Board Joint Compound	***No***	NAD (by NYS ELAP 198.1) by Ivan H. Reyes on 10/21/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Reporting Notes:

Analyzed by: Ivan H. Reyes
Date: 10/21/2023

Reviewed by: Ivan H. Reyes

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

1 of 1

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/19/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
SR-9-A	Gypsum board	Building L - Room L216 - 2nd Floor	X						
SR-9-B	↓	Building L - Studio L5 - 1st floor	X						
JC-9-A	Gypsum board joint compound	Building L - Room L216 - 2nd Floor	X						
JC-9-B	↓	Building L - Studio L5 - 1st floor	X						

223102681

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X			

Total No. of Samples: 4

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/19/2023	FedEx 19:30		10/20/23	10:41
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

Telescope/Observatory Building & Snack Bar/Food Stand

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/17/23
Date Examined 10/20/23
ELAP # 11480

AmeriSci Job # 223102384
P.O. #
Page 1 **of** 4

RE: 101061220; Horace Greeley High School - Telescope Building; 70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SR-1-A SR	223102384-01 **Location:** Telescope Building, Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 2%, Non-fibrous 98%			
SR-1-B SR	223102384-02 **Location:** Telescope Building, Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 8%, Non-fibrous 92%			
CM-1-A CM	223102384-03 **Location:** Telescope Building, Cinderblock Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
CM-1-B CM	223102384-04 **Location:** Telescope Building, Cinderblock Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
ST-1 ST	223102384-05 **Location:** Telescope Building - Exterior Perimeter Walls, Stucco Plaster	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Telescope Building;
70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
ST-2	223102384-06	***No***	NAD
ST	**Location:** Telescope Building - Exterior Perimeter Walls, Stucco Plaster		(by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
ST-3	223102384-07	***No***	NAD
ST	**Location:** Telescope Building - Exterior Perimeter Walls, Stucco Plaster		(by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
PL-1	223102384-08	***No***	NAD
PL	**Location:** Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation		(by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
PL-2	223102384-09	***No***	NAD
PL	**Location:** Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation		(by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
PL-3	223102384-10	***No***	NAD
PL	**Location:** Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation		(by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MSC-1-A	223102384-11	***No***	NAD
MSC	**Location:** Telescope Building - Dome - Interior/Exterior, Caulking Associated With Metal Sheets Joints Around The Dome		(by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 35%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Telescope Building;
70 Roaring Brook Rd, Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MSC-1-B MSC	223102384-12 **Location:** Telescope Building - Dome - Interior/Exterior, Caulking Associated With Metal Sheets Joints Around The Dome	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 33.3%			
DC-1-A DC	223102384-13 **Location:** Telescope Building - Perimeter Walls, Door Caulking	***Yes***	Trace (<0.25 % pc)[1] (ELAP 400 PC) by Jared C. Clarke on 10/20/23
Analyst Description: White/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Anthophyllite <0.25 % pc **Other Material:** Fibrous Talc 2%, Non-fibrous 31%			
DC-1-B DC	223102384-14 **Location:** Telescope Building - Perimeter Walls, Door Caulking	***Yes***	Trace (<0.25 % pc)[1] (ELAP 400 PC) by Jared C. Clarke on 10/20/23
Analyst Description: White/Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Anthophyllite <0.25 % pc **Other Material:** Fibrous Talc 2%, Non-fibrous 34%			
FWJM-1-A FWJM	223102384-15 **Location:** Telescope Building - Perimeter Walls - Interior, Black Packing Material Associated With Concrete Floor And Cinderblock Wall Joint	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.9%			
FWJM-1-B FWJM	223102384-16 **Location:** Telescope Building - Perimeter Walls - Interior, Black Packing Material Associated With Concrete Floor And Cinderblock Wall Joint	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 4.5%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Telescope Building;
70 Roaring Brook Rd, Chappaqua, NY 10514

Reporting Notes:

(1) Sample prepared for analysis by ELAP 198.6 method

Analyzed by: Jared C. Clarke
Date: 10/20/2023

Reviewed by: Marik Peysakhov

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000326, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School - Telescope Building; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	SR-1-A	SR	----	----	----	----	NAD	NA
Location:	Telescope Building, Gypsum Board							
02	SR-1-B	SR	----	----	----	----	NAD	NA
Location:	Telescope Building, Gypsum Board							
03	CM-1-A	CM	----	----	----	----	NAD	NA
Location:	Telescope Building, Cinderblock Mortar							
04	CM-1-B	CM	----	----	----	----	NAD	NA
Location:	Telescope Building, Cinderblock Mortar							
05	ST-1	ST	----	----	----	----	NAD	NA
Location:	Telescope Building - Exterior Perimeter Walls, Stucco Plaster							
06	ST-2	ST	----	----	----	----	NAD	NA
Location:	Telescope Building - Exterior Perimeter Walls, Stucco Plaster							
07	ST-3	ST	----	----	----	----	NAD	NA
Location:	Telescope Building - Exterior Perimeter Walls, Stucco Plaster							
08	PL-1	PL	----	----	----	----	NAD	NA
Location:	Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation							
09	PL-2	PL	----	----	----	----	NAD	NA
Location:	Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation							
10	PL-3	PL	----	----	----	----	NAD	NA
Location:	Telescope Building - Interior Perimeter Walls, Plaster Associated With Column Base Under Telescope Foundation							
11	MSC-1-A	MSC	0.197	52.6	12.3	35.0	NAD	NAD
Location:	Telescope Building - Dome - Interior/Exterior, Caulking Associated With Metal Sheets Joints Around The Dome							
12	MSC-1-B	MSC	0.203	53.0	13.7	33.3	NAD	NAD
Location:	Telescope Building - Dome - Interior/Exterior, Caulking Associated With Metal Sheets Joints Around The Dome							
13	DC-1-A	DC	0.288	59.9	7.1	32.8	Anthophyllite <0.25	Anthophyllite <1.0
Location:	Telescope Building - Perimeter Walls, Door Caulking							
14	DC-1-B	DC	0.344	57.8	6.2	35.8	Anthophyllite <0.25	Anthophyllite <1.0
Location:	Telescope Building - Perimeter Walls, Door Caulking							
15	FWJM-1-A	FWJM	0.513	92.6	2.5	4.9	NAD	NAD
Location:	Telescope Building - Perimeter Walls - Interior, Black Packing Material Associated With Concrete Floor And Cinderblock Wall Joint							
16	FWJM-1-B	FWJM	0.572	93.6	1.9	4.5	NAD	NAD
Location:	Telescope Building - Perimeter Walls - Interior, Black Packing Material Associated With Concrete Floor And Cinderblock Wall Joint							

See Reporting notes on last page

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School - Telescope Building; 70 Roaring Brook Rd, Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM

Analyzed by: Marik Peysakhov
Date: 10/20/2023

Reviewed by: Marik Peysakhov

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Horace Greeley High School - Telescope Building		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/16/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
SR-1-A	Gypsum board	Telescope Building	X						
SR-1-B	Gypsum board	Telescope Building	X						
CM-1-A	Cinderblock mortar	Telescope Building	X						
CM-1-B	Cinderblock mortar	Telescope Building	X						
ST-1	Stucco plaster	Telescope Building - Exterior perimeter walls	X						
ST-2	Stucco plaster	Telescope Building - Exterior perimeter walls	X						
ST-3	Stucco plaster	Telescope Building - Exterior perimeter walls	X						
PL-1	Plaster associated with column base under telescope foundation	Telescope Building - Interior perimeter walls	X						
PL-2	Plaster associated with column base under telescope foundation	Telescope Building - Interior perimeter walls	X						
PL-3	Plaster associated with column base under telescope foundation	Telescope Building - Interior	X						

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Total No. of Samples: 10

Turnaround Request:

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/16/2023	FedEx 18:15		10/17/23	1120
Company: **LANGAN**			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102384

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Horace Greeley High School - Telescope Building		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/16/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
MSC-1-A	Caulking associated with metal sheets joints around the Dome	Telescope Building - Dome - Interior/exterior		X	X				
MSC-1-B	Caulking associated with metal sheets joints around the Dome	Telescope Building - Dome - Interior/exterior		X	X				
DC-1-A	Door caulking	Telescope Building - Perimeter walls		X	X				
DC-1-B	Door caulking	Telescope Building - Perimeter walls		X	X				
FWJM-1-A	Black packing material associated with concrete floor and cinderblock wall joint	Telescope Building - Perimeter walls - Interior		X	X				
FWJM-1-B	Black packing material associated with concrete floor and cinderblock wall joint	Telescope Building - Perimeter walls - Interior		X	X				

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
				X		

Total No. of Samples: 6

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Sanjay Patel	Date:	Time:	Received by:	Date: / Time:
		10/16/2023	FedEx 18:15		10/17/23 1120
Company: LANGAN				Company: AmeriSci	

Laboratory Name: AmeriSci, NY, NY

223102384

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/17/23
Date Examined 10/20/23
ELAP # 11480

AmeriSci Job # 223102385
P.O. #
Page 1 **of** 4

RE: 101061220; Horace Greeley High School - Food Stand Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CM-1-A CM1	223102385-01 **Location:** Food Stand Building, Cinderblock Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
CM-1-B CM1	223102385-02 **Location:** Food Stand Building, Cinderblock Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
ST-1 ST	223102385-03 **Location:** Food Stand Building - Exterior Perimeter Walls, Stucco Plaster	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
ST-2 ST	223102385-04 **Location:** Food Stand Building - Exterior Perimeter Walls, Stucco Plaster	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
ST-3 ST	223102385-05 **Location:** Food Stand Building - Exterior Perimeter Walls, Stucco Plaster	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Food Stand
Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
QTGR-1-A QTGR	223102385-06 **Location:** Food Stand Building, Grout Associated With Quarry Floor Tiles	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
QTGR-1-B QTGR	223102385-07 **Location:** Food Stand Building, Grout Associated With Quarry Floor Tiles	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
QTBM-1-A QTBM	223102385-08 **Location:** Food Stand Building, Bedding Mortar Associated With Quarry Floor Tiles	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
QTBM-1-B QTBM	223102385-09 **Location:** Food Stand Building, Bedding Mortar Associated With Quarry Floor Tiles	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
CPP-1-A CPP	223102385-10 **Location:** Food Stand Building, 2'x2' With Pin Holes Ceiling Panels	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 34.8%			
CPP-1-B CPP	223102385-11 **Location:** Food Stand Building, 2'x2' With Pin Holes Ceiling Panels	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 49%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Food Stand
Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RS-1-A RS1	223102385-12L1 **Location:** Food Stand Building, Roof Shingles	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 51.7%			
RS-1-A RS1	223102385-12L2 **Location:** Food Stand Building, Roof Shingles Associated Tar Paper	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.8%			
RS-1-B RS1	223102385-13L1 **Location:** Food Stand Building, Roof Shingles	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 32.4%			
RS-1-B RS1	223102385-13L2 **Location:** Food Stand Building, Roof Shingles Associated Tar Paper	***No***	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.7%			
MM-1-A MM1	223102385-14 **Location:** Mortar Associated With Stone Wall Near Food Stand Build, Masonry Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			
MM-1-B MM1	223102385-15 **Location:** Mortar Associated With Stone Wall Near Food Stand Build, Masonry Mortar	***No***	NAD (by NYS ELAP 198.1) by Jared C. Clarke on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School - Food Stand
Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

Reporting Notes:

Analyzed by: Jared C. Clarke
Date: 10/20/2023

Reviewed by: Marik Peysakhov

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000326, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School - Food Stand Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	CM-1-A	CM1	----	----	----	----	NAD	NA
Location:	Food Stand Building, Cinderblock Mortar							
02	CM-1-B	CM1	----	----	----	----	NAD	NA
Location:	Food Stand Building, Cinderblock Mortar							
03	ST-1	ST	----	----	----	----	NAD	NA
Location:	Food Stand Building - Exterior Perimeter Walls, Stucco Plaster							
04	ST-2	ST	----	----	----	----	NAD	NA
Location:	Food Stand Building - Exterior Perimeter Walls, Stucco Plaster							
05	ST-3	ST	----	----	----	----	NAD	NA
Location:	Food Stand Building - Exterior Perimeter Walls, Stucco Plaster							
06	QTGR-1-A	QTGR	----	----	----	----	NAD	NA
Location:	Food Stand Building, Grout Associated With Quarry Floor Tiles							
07	QTGR-1-B	QTGR	----	----	----	----	NAD	NA
Location:	Food Stand Building, Grout Associated With Quarry Floor Tiles							
08	QTBM-1-A	QTBM	----	----	----	----	NAD	NA
Location:	Food Stand Building, Bedding Mortar Associated With Quarry Floor Tiles							
09	QTBM-1-B	QTBM	----	----	----	----	NAD	NA
Location:	Food Stand Building, Bedding Mortar Associated With Quarry Floor Tiles							
10	CPP-1-A	CPP	0.304	17.9	47.3	34.8	NAD	NAD
Location:	Food Stand Building, 2'x2' With Pin Holes Ceiling Panels							
11	CPP-1-B	CPP	0.160	24.8	26.3	49.0	NAD	NAD
Location:	Food Stand Building, 2'x2' With Pin Holes Ceiling Panels							
12L1	RS-1-A	RS1	0.617	20.3	28.0	51.7	NAD	NAD
Location:	Food Stand Building, Roof Shingles							
12L2	RS-1-A	RS1	0.353	67.4	24.8	7.8	NAD	NAD
Location:	Food Stand Building, Roof Shingles Associated Tar Paper							
13L1	RS-1-B	RS1	0.554	23.3	44.4	32.4	NAD	NAD
Location:	Food Stand Building, Roof Shingles							
13L2	RS-1-B	RS1	0.280	63.8	24.4	11.7	NAD	NAD
Location:	Food Stand Building, Roof Shingles Associated Tar Paper							
14	MM-1-A	MM1	----	----	----	----	NAD	NA
Location:	Mortar Associated With Stone Wall Near Food Stand Build, Masonry Mortar							

See Reporting notes on last page

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School - Food Stand Building; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
15	MM-1-B	MM1	----	----	----	----	NAD	NA

Location: Mortar Associated With Stone Wall Near Food Stand Build, Masonry Mortar

Analyzed by: Marik Peysakhov
Date: 10/20/2023

Reviewed by: Marik Peysakhov

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H600-Noran 7 System, Microscope, Serial #: 600-27-6. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

1 of 2

Project Name:	Horace Greeley High School - Food Stand Building		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/16/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
CM-1-A	Cinderblock mortar	Food Stand building	X						
CM-1-B	Cinderblock mortar	Food Stand building	X						
ST-1	Stucco plaster	Food Stand building - Exterior perimeter walls	X						
ST-2	Stucco plaster	Food Stand building - Exterior perimeter walls	X						
ST-3	Stucco plaster	Food Stand building - Exterior perimeter walls	X						
QTGR-1-A	Grout associated with quarry floor tiles	Food Stand building	X						
QTGR-1-B	Grout associated with quarry floor tiles	Food Stand building	X						
QTBM-1-A	Bedding mortar associated with quarry floor tiles	Food Stand building	X						
QTBM-1-B	Bedding mortar associated with quarry floor tiles	Food Stand building	X						

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
					X	

Total No. of Samples: 9

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/16/2023	FedEx 18:15		10/17/23	1120
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102385

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Horace Greeley High School - Food Stand Building		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/16/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
CPP-1-A	2'x2' with pin holes ceiling panels	Food Stand building		X	X				
CPP-1-B	2'x2' with pin holes ceiling panels	Food Stand building		X	X				
RS-1-A	Roof shingles and associated tar paper	Food Stand building		X	X				
RS-1-B	Roof shingles and associated tar paper	Food Stand building		X	X				
MM-1-A	Masonry mortar	Mortar associated with stone wall near Food Stand Build	X						
MM-1-B	Masonry mortar	Mortar associated with stone wall near Food Stand Build	X						

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
					X	

Total No. of Samples: 6

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/16/2023	FedEx 18:15		10/17/23	1120
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

223102385

Roofs/Exterior Samples

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental Se
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/18/23
Date Examined 10/20/23
ELAP # 11480

AmeriSci Job # 223102507
P.O. #
Page 1 **of** 13

RE: 101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-1-A L1 RM1	223102507-01 **Location:** Roof 1 - Roof Over Weight Room / Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 28.6%			
RM-1-A L2 RM1	223102507-02 **Location:** Roof 1 - Roof Over Weight Room / Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 1.1%			
RM-1-A L3 RM1	223102507-03 **Location:** Roof 1 - Roof Over Weight Room / Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 90%, Fibrous glass Trace, Non-fibrous 10%			
RM-1-B L1 RM1	223102507-04 **Location:** Roof 1 - Roof Over Weight Room / Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 30.9%			
RM-1-B L2 RM1	223102507-05 **Location:** Roof 1 - Roof Over Weight Room / Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black/Tan, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 0.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-1-B L3 RM1	223102507-06 **Location:** Roof 1 - Roof Over Weight Room / Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 80%, Fibrous glass 3%, Non-fibrous 17%			
RM-2-A L1 RM2	223102507-07 **Location:** Roof 2 - Roof Over Main Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 29%			
RM-2-A L2 RM2	223102507-08 **Location:** Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 0.2%			
RM-2-A L3 RM2	223102507-09 **Location:** Roof 2 - Roof Over Main Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Yellow, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 70%, Fibrous glass 2%, Non-fibrous 28%			
RM-2-A L4 RM2	223102507-10 **Location:** Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper On Tectum Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Beige/Silver/Tan, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 10%, Non-fibrous 14%			
RM-2-A L5 RM2	223102507-11 **Location:** Roof 2 - Roof Over Main Gym - Tectum Roof Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Beige, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 45%, Non-fibrous 55%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-2-B L1 RM2	223102507-12 **Location:** Roof 2 - Roof Over Main Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 26.3%			
RM-2-B L2 RM2	223102507-13 **Location:** Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 2%, Non-fibrous 32.8%			
RM-2-B L3 RM2	223102507-14 **Location:** Roof 2 - Roof Over Main Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Fibrous glass Trace, Non-fibrous 25%			
RM-2-B L4 RM2	223102507-15 **Location:** Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper On Tectum Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 9.4%			
RM-2-B L5 RM2	223102507-16 **Location:** Roof 2 - Roof Over Main Gym - Tectum Roof Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Beige, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 30%, Non-fibrous 70%			
RM-3-A L1 RM3	223102507-17 **Location:** Roof 3 - Roof Over Building L - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 36.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-3-A L2 RM3	223102507-18 **Location:** Roof 3 - Roof Over Building L - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Fibrous glass 10%, Non-fibrous 90%			
RM-3-A L3 RM3	223102507-19 **Location:** Roof 3 - Roof Over Building L - Felt Paper Associated With Up To 10-Inch Thick Foam Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 85%, Fibrous glass Trace, Non-fibrous 15%			
RM-3-A L4 RM3	223102507-20 **Location:** Roof 3 - Roof Over Building L - Tar Paper / Mastic On Metal Deck	***Yes***	12% (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 12.0 % **Other Material:** Non-fibrous 11.9%			
RM-3-B L1 RM3	223102507-21 **Location:** Roof 3 - Roof Over Building L - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black/Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 24.7%			
RM-3-B L2 RM3	223102507-22 **Location:** Roof 3 - Roof Over Building L - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 30%, Fibrous glass 15%, Non-fibrous 55%			
RM-3-B L3 RM3	223102507-23 **Location:** Roof 3 - Roof Over Building L - Felt Paper Associated With Up To 10-Inch Thick Foam Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Yellow, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 70%, Fibrous glass Trace, Non-fibrous 30%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-3-B L4 RM3	223102507-24 **Location:** Roof 3 - Roof Over Building L - Tar Paper / Mastic On Metal Deck		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
RF-1-A RF1	223102507-25 **Location:** Roof 3 - Roof Over Building L - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 42.9%			
RF-1-B RF1	223102507-26 **Location:** Roof 3 - Roof Over Building L - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 20.7%			
PMA-1-A PMA1	223102507-27 **Location:** Roof 3 - Roof Over Building L - Mastic On Gray Caulk Around Pipe Associated With HVAC Units	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black/Gray, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.4%			
PMA-1-B PMA1	223102507-28 **Location:** Roof 3 - Roof Over Building L - Mastic On Gray Caulk Around Pipe Associated With HVAC Units	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black/Gray, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 13.5%			
HC-1-A HC1	223102507-29 **Location:** Roof 3 - Roof Over Building L - Caulking Associated With Rooftop HVAC Units	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 24%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
HC-1-B HC1	223102507-30 **Location:** Roof 3 - Roof Over Building L - Caulking Associated With Rooftop HVAC Units	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 23.1%			
RM-4-A L1 RM4	223102507-31 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 15.6%			
RM-4-A L2 RM4	223102507-32 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Tar Paper Under Plywood	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.6%			
RM-4-B L1 RM4	223102507-33 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 16.8%			
RM-4-B L2 RM4	223102507-34 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Tar Paper Under Plywood	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.3%			
RF-2-A RF2	223102507-35 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 15%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RF-2-B RF2	223102507-36 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.4%			
PC-1-A PC1	223102507-37 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Pipe Cover Material Under Buildings J - F Connector	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 1%, Non-fibrous 99%			
PC-1-B PC1	223102507-38 **Location:** Roof 4 - Roof Over Buildings J - F Connector - Pipe Cover Material Under Buildings J - F Connector	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 2%, Non-fibrous 98%			
RM-5-A L1 RM5	223102507-39 **Location:** Roof 5 - Roof Over Cafeteria - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 39.9%			
RM-5-A L2 RM5	223102507-40 **Location:** Roof 5 - Roof Over Cafeteria - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose Trace, Fibrous glass 10%, Non-fibrous 90%			
RM-5-A L3 RM5	223102507-41 **Location:** Roof 5 - Roof Over Cafeteria - Felt Paper Associated With Up To 6-Inch Thick Foam Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Yellow, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 80%, Fibrous glass Trace, Non-fibrous 20%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-5-A L4 RM5	223102507-42 **Location:** Roof 5 - Roof Over Cafeteria - Tar Paper / Mastic On Metal Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.4%			
RM-5-B L1 RM5	223102507-43 **Location:** Roof 5 - Roof Over Cafeteria - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 37.2%			
RM-5-B L2 RM5	223102507-44 **Location:** Roof 5 - Roof Over Cafeteria - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 10%, Non-fibrous 90%			
RM-5-B L3 RM5	223102507-45 **Location:** Roof 5 - Roof Over Cafeteria - Felt Paper Associated With Up To 6-Inch Thick Foam Insulation	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Yellow, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Fibrous glass Trace, Non-fibrous 25%			
RM-5-B L4 RM5	223102507-46 **Location:** Roof 5 - Roof Over Cafeteria - Tar Paper / Mastic On Metal Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.9%			
SDC-1-A SDC1	223102507-47 **Location:** Roof 5 - Roof Over Cafeteria - Black Material Associated With Silver Lining On Fiberglass Duct Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Silver/Black/Tan, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 1%, Non-fibrous 10.7%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
SDC-1-B SDC1	223102507-48 **Location:** Roof 5 - Roof Over Cafeteria - Black Material Associated With Silver Lining On Fiberglass Duct Insulation	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Silver/Black/Tan, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass Trace, Non-fibrous 10.5%			
RM-6-A RM6	223102507-49 **Location:** Roof 6 - Canopy Roof Between Buildings F & K - Up To 1/2-Inch Thick Built-Up Roofing Material Under Up To 1-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.1%			
RM-6-B RM6	223102507-50 **Location:** Roof 6 - Canopy Roof Between Buildings F & K - Up To 1/2-Inch Thick Built-Up Roofing Material Under Up To 1-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.5%			
RM-7-A L1 RM7	223102507-51 **Location:** Roof 7 - Canopy Roof By Main Entrance - Up To 3/8-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 14%			
RM-7-A L2 RM7	223102507-52 **Location:** Roof 7 - Canopy Roof By Main Entrance - 1/8-Inch Thick Roofing Membrane Under 2-Inch Thick Press Wood Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 7%, Non-fibrous 8.8%			
RM-7-B L1 RM7	223102507-53 **Location:** Roof 7 - Canopy Roof By Main Entrance - Up To 3/8-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 4%, Non-fibrous 3.6%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-7-B L2 RM7	223102507-54 **Location:** Roof 7 - Canopy Roof By Main Entrance - 1/8-Inch Thick Roofing Membrane Under 2-Inch Thick Press Wood Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 7%, Non-fibrous 8.8%			
RF-3-A RF3	223102507-55 **Location:** Roof 7 - Canopy Roof By Main Entrance - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 38.7%			
RF-3-B RF3	223102507-56 **Location:** Roof 7 - Canopy Roof By Main Entrance - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Black, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 2%, Non-fibrous 36.6%			
RM-8-A L1 RM8	223102507-57 **Location:** Roof 8 - Canopy Roof By Auditorium - Up To 1/4-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 10%, Non-fibrous 9.7%			
RM-8-A L2 RM8	223102507-58 **Location:** Roof 8 - Canopy Roof By Auditorium - Felt Paper Associated With Up To 4-Inch Thick Foam Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7.9%			
RM-8-B L1 RM8	223102507-59 **Location:** Roof 8 - Canopy Roof By Auditorium - Up To 1/4-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 2%, Non-fibrous 15.9%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-8-B L2 RM8	223102507-60 **Location:** Roof 8 - Canopy Roof By Auditorium - Felt Paper Associated With Up To 4-Inch Thick Foam Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 2%, Non-fibrous 17.3%			
CFC-1-A CFC1	223102507-61 **Location:** Roof 9 - Canopy Roof By Gymnasium - Counter Flash Caulking	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6%			
CFC-1-B CFC1	223102507-62 **Location:** Roof 9 - Canopy Roof By Gymnasium - Counter Flash Caulking	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.7%			
RM-9-A L1 RM9	223102507-63 **Location:** Roof 9 - Canopy Roof By Gymnasium - Built-Up Roofing Material Up To 1/2-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 5%, Non-fibrous 32.9%			
RM-9-A L2 RM9	223102507-64 **Location:** Roof 9 - Canopy Roof By Gymnasium - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Brown/Gray, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 35%, Non-fibrous 65%			
RM-9-A L3 RM9	223102507-65 **Location:** Roof 9 - Canopy Roof By Gymnasium - Felt Paper Associated With Up To 2-Inch Thick Foam Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray/Yellow, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 75%, Fibrous glass Trace, Non-fibrous 25%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
RM-9-B L1 RM9	223102507-66 **Location:** Roof 9 - Canopy Roof By Gymnasium - Built-Up Roofing Material Up To 1/2-Inch Thick Built-Up Roofing Materials	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 3%, Non-fibrous 47%			
RM-9-B L2 RM9	223102507-67 **Location:** Roof 9 - Canopy Roof By Gymnasium - 1/2-Inch Thick Gypsum Board	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Off-White/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 7%, Non-fibrous 93%			
RM-9-B L3 RM9	223102507-68 **Location:** Roof 9 - Canopy Roof By Gymnasium - Felt Paper Associated With Up To 2-Inch Thick Foam Insulation On Wood Deck	***No***	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 10/20/23
Analyst Description: Gray, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 70%, Fibrous glass Trace, Non-fibrous 30%			
RF-4-A RF4	223102507-69 **Location:** Roof 9 - Canopy Roof By Gymnasium - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Off-White/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.7%			
RF-4-B RF4	223102507-70 **Location:** Roof 9 - Canopy Roof By Gymnasium - Roof Flashing / Mastic	***No***	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 10/20/23
Analyst Description: Off-White/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 20.4%			

See Reporting notes on last page

PLM Bulk Asbestos Report

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

Reporting Notes:

Analyzed by: Valeriu Voicu
Date: 10/20/2023

Reviewed by: Marik Peysakhov

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	RM-1-A L1	RM1	1.116	44.4	21.9	33.6	NAD	NAD
Location:	Roof 1 - Roof Over Weight Room / Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
02	RM-1-A L2	RM1	0.345	97.7	1.2	1.1	NAD	NAD
Location:	Roof 1 - Roof Over Weight Room / Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation							
03	RM-1-A L3	RM1	----	----	----	----	NAD	NA
Location:	Roof 1 - Roof Over Weight Room / Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck							
04	RM-1-B L1	RM1	0.726	48.7	17.5	33.9	NAD	NAD
Location:	Roof 1 - Roof Over Weight Room / Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
05	RM-1-B L2	RM1	0.161	47.6	51.7	0.6	NAD	NAD
Location:	Roof 1 - Roof Over Weight Room / Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation							
06	RM-1-B L3	RM1	----	----	----	----	NAD	NA
Location:	Roof 1 - Roof Over Weight Room / Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck							
07	RM-2-A L1	RM2	0.870	51.9	14.1	34.0	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
08	RM-2-A L2	RM2	0.210	99.5	0.2	0.2	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation							
09	RM-2-A L3	RM2	----	----	----	----	NAD	NA
Location:	Roof 2 - Roof Over Main Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck							
10	RM-2-A L4	RM2	0.289	49.6	26.3	24.0	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper On Tectum Deck							
11	RM-2-A L5	RM2	----	----	----	----	NAD	NA
Location:	Roof 2 - Roof Over Main Gym - Tectum Roof Deck							
12	RM-2-B L1	RM2	0.740	51.6	19.1	29.3	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
13	RM-2-B L2	RM2	0.251	54.0	11.2	34.8	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper Under Up To 2-Inch Thick Fiberglass Insulation							
14	RM-2-B L3	RM2	----	----	----	----	NAD	NA
Location:	Roof 2 - Roof Over Main Gym - Felt Paper Associated With 4-Inch Thick Foam Insulation On Metal Deck							
15	RM-2-B L4	RM2	0.241	49.0	38.6	12.4	NAD	NAD
Location:	Roof 2 - Roof Over Main Gym - 1/16-Inch Thick Tar Paper On Tectum Deck							
16	RM-2-B L5	RM2	----	----	----	----	NAD	NA
Location:	Roof 2 - Roof Over Main Gym - Tectum Roof Deck							

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Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	RM-3-A L1	RM3	0.850	44.6	13.7	41.7	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
18	RM-3-A L2	RM3	----	----	----	----	NAD	NA
Location:	Roof 3 - Roof Over Building L - 1/2-Inch Thick Gypsum Board							
19	RM-3-A L3	RM3	----	----	----	----	NAD	NA
Location:	Roof 3 - Roof Over Building L - Felt Paper Associated With Up To 10-Inch Thick Foam Insulation							
20	RM-3-A L4	RM3	0.249	72.9	3.3	12.0	Chrysotile 12.0	NA
Location:	Roof 3 - Roof Over Building L - Tar Paper / Mastic On Metal Deck							
21	RM-3-B L1	RM3	0.501	52.0	18.3	29.7	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
22	RM-3-B L2	RM3	----	----	----	----	NAD	NA
Location:	Roof 3 - Roof Over Building L - 1/2-Inch Thick Gypsum Board							
23	RM-3-B L3	RM3	----	----	----	----	NAD	NA
Location:	Roof 3 - Roof Over Building L - Felt Paper Associated With Up To 10-Inch Thick Foam Insulation							
24	RM-3-B L4	RM3	0.258	54.6	4.9	40.5	NA/PS	NA
Location:	Roof 3 - Roof Over Building L - Tar Paper / Mastic On Metal Deck							
25	RF-1-A	RF1	0.729	45.1	9.0	45.9	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Roof Flashing / Mastic							
26	RF-1-B	RF1	0.567	50.9	23.4	25.7	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Roof Flashing / Mastic							
27	PMA-1-A	PMA1	0.459	64.0	24.6	11.4	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Mastic On Gray Caulk Around Pipe Associated With HVAC Units							
28	PMA-1-B	PMA1	0.414	64.0	22.5	13.5	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Mastic On Gray Caulk Around Pipe Associated With HVAC Units							
29	HC-1-A	HC1	0.291	32.5	43.5	24.0	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Caulking Associated With Rooftop HVAC Units							
30	HC-1-B	HC1	0.298	31.3	45.6	23.1	NAD	NAD
Location:	Roof 3 - Roof Over Building L - Caulking Associated With Rooftop HVAC Units							
31	RM-4-A L1	RM4	0.610	51.6	29.8	18.6	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
32	RM-4-A L2	RM4	0.166	98.2	1.2	0.6	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Tar Paper Under Plywood							

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Table I
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101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	RM-4-B L1	RM4	0.759	51.3	28.9	19.8	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
34	RM-4-B L2	RM4	0.547	61.6	19.0	19.3	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Tar Paper Under Plywood							
35	RF-2-A	RF2	0.548	61.1	23.8	15.0	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Roof Flashing / Mastic							
36	RF-2-B	RF2	0.163	96.4	2.3	1.4	NAD	NAD
Location:	Roof 4 - Roof Over Buildings J - F Connector - Roof Flashing / Mastic							
37	PC-1-A	PC1	----	----	----	----	NAD	NA
Location:	Roof 4 - Roof Over Buildings J - F Connector - Pipe Cover Material Under Buildings J - F Connector							
38	PC-1-B	PC1	----	----	----	----	NAD	NA
Location:	Roof 4 - Roof Over Buildings J - F Connector - Pipe Cover Material Under Buildings J - F Connector							
39	RM-5-A L1	RM5	0.705	47.7	9.3	42.9	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
40	RM-5-A L2	RM5	----	----	----	----	NAD	NA
Location:	Roof 5 - Roof Over Cafeteria - 1/2-Inch Thick Gypsum Board							
41	RM-5-A L3	RM5	----	----	----	----	NAD	NA
Location:	Roof 5 - Roof Over Cafeteria - Felt Paper Associated With Up To 6-Inch Thick Foam Insulation							
42	RM-5-A L4	RM5	0.280	99.3	0.3	0.4	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Tar Paper / Mastic On Metal Deck							
43	RM-5-B L1	RM5	1.130	41.9	15.9	42.2	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Built-Up Roofing Material Up To 3/8-Inch Thick Built-Up Roofing Materials							
44	RM-5-B L2	RM5	----	----	----	----	NAD	NA
Location:	Roof 5 - Roof Over Cafeteria - 1/2-Inch Thick Gypsum Board							
45	RM-5-B L3	RM5	----	----	----	----	NAD	NA
Location:	Roof 5 - Roof Over Cafeteria - Felt Paper Associated With Up To 6-Inch Thick Foam Insulation							
46	RM-5-B L4	RM5	0.408	95.7	0.3	3.9	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Tar Paper / Mastic On Metal Deck							
47	SDC-1-A	SDC1	0.329	73.0	15.4	11.7	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Black Material Associated With Silver Lining On Fiberglass Duct Insulation							
48	SDC-1-B	SDC1	0.274	74.5	14.9	10.5	NAD	NAD
Location:	Roof 5 - Roof Over Cafeteria - Black Material Associated With Silver Lining On Fiberglass Duct Insulation							

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Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	RM-6-A	RM6	0.353	95.2	1.7	3.1	NAD	NAD
Location:	Roof 6 - Canopy Roof Between Buildings F & K - Up To 1/2-Inch Thick Built-Up Roofing Material Under Up To 1-Inch Gravels							
50	RM-6-B	RM6	0.553	96.7	0.8	2.5	NAD	NAD
Location:	Roof 6 - Canopy Roof Between Buildings F & K - Up To 1/2-Inch Thick Built-Up Roofing Material Under Up To 1-Inch Gravels							
51	RM-7-A L1	RM7	0.795	62.6	20.5	17.0	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - Up To 3/8-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels							
52	RM-7-A L2	RM7	0.421	66.0	18.2	15.8	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - 1/8-Inch Thick Roofing Membrane Under 2-Inch Thick Press Wood Insulation On Wood Deck							
53	RM-7-B L1	RM7	0.712	63.6	28.8	7.6	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - Up To 3/8-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels							
54	RM-7-B L2	RM7	0.690	65.2	19.0	15.8	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - 1/8-Inch Thick Roofing Membrane Under 2-Inch Thick Press Wood Insulation On Wood Deck							
55	RF-3-A	RF3	0.971	42.0	16.3	41.7	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - Roof Flashing / Mastic							
56	RF-3-B	RF3	0.726	48.5	12.9	38.6	NAD	NAD
Location:	Roof 7 - Canopy Roof By Main Entrance - Roof Flashing / Mastic							
57	RM-8-A L1	RM8	0.505	58.1	22.2	19.7	NAD	NAD
Location:	Roof 8 - Canopy Roof By Auditorium - Up To 1/4-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels							
58	RM-8-A L2	RM8	0.104	88.3	3.8	7.9	NAD	NAD
Location:	Roof 8 - Canopy Roof By Auditorium - Felt Paper Associated With Up To 4-Inch Thick Foam Insulation On Wood Deck							
59	RM-8-B L1	RM8	0.581	61.7	20.4	17.9	NAD	NAD
Location:	Roof 8 - Canopy Roof By Auditorium - Up To 1/4-Inch Thick Built-Up Roofing Material Under Up To 1.5-Inch Gravels							
60	RM-8-B L2	RM8	0.334	56.9	23.8	19.3	NAD	NAD
Location:	Roof 8 - Canopy Roof By Auditorium - Felt Paper Associated With Up To 4-Inch Thick Foam Insulation On Wood Deck							
61	CFC-1-A	CFC1	0.248	77.3	17.0	5.6	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Counter Flash Caulking							
62	CFC-1-B	CFC1	0.228	75.1	16.2	8.7	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Counter Flash Caulking							
63	RM-9-A L1	RM9	1.019	47.4	14.7	37.9	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Built-Up Roofing Material Up To 1/2-Inch Thick Built-Up Roofing Materials							
64	RM-9-A L2	RM9	----	----	----	----	NAD	NA
Location:	Roof 9 - Canopy Roof By Gymnasium - 1/2-Inch Thick Gypsum Board							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results

101061220; Horace Greeley High School; 70 Roaring Brook Rd., Chappaqua, NY 10514

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
65	RM-9-A L3	RM9	----	----	----	----	NAD	NA
Location:	Roof 9 - Canopy Roof By Gymnasium - Felt Paper Associated With Up To 2-Inch Thick Foam Insulation On Wood Deck							
66	RM-9-B L1	RM9	0.771	49.5	0.5	50.0	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Built-Up Roofing Material Up To 1/2-Inch Thick Built-Up Roofing Materials							
67	RM-9-B L2	RM9	----	----	----	----	NAD	NA
Location:	Roof 9 - Canopy Roof By Gymnasium - 1/2-Inch Thick Gypsum Board							
68	RM-9-B L3	RM9	----	----	----	----	NAD	NA
Location:	Roof 9 - Canopy Roof By Gymnasium - Felt Paper Associated With Up To 2-Inch Thick Foam Insulation On Wood Deck							
69	RF-4-A	RF4	0.461	80.6	6.7	12.7	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Roof Flashing / Mastic							
70	RF-4-B	RF4	0.399	57.6	22.0	20.4	NAD	NAD
Location:	Roof 9 - Canopy Roof By Gymnasium - Roof Flashing / Mastic							

Analyzed by: Marik Peysakhov
Date: 10/20/2023

Reviewed by: Marik Peysakhov

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H600-Noran 7 System, Microscope, Serial #: 600-27-6. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

1 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
RM-1-A	Built-up roofing material L1: Up to 3/8-inch thick built-up roofing materials	Roof 1 - Roof over weight room/gym		X	X				
	L2: 1/16-inch thick tar paper under up to 2-inch thick fiberglass insulation			X	X				
	L3: Felt paper associated with 4-inch thick foam insulation on metal deck			X	X				
RM-1-B	↓	Roof 1 - Roof over weight room/gym		X	X				
RM-2-A	Built-up roofing material L1: Up to 3/8-inch thick built-up roofing materials	Roof 2 - Roof over main gym		X	X				
	L2: 1/16-inch thick tar paper under up to 2-inch thick fiberglass insulation			X	X				
	L3: Felt paper associated with 4-inch thick foam insulation on metal deck			X	X				
	L4: 1/16-inch thick tar paper on tectum deck			X	X				
	L5: Tectum roof deck		X						
RM-2-B	↓	Roof 2 - Roof over main gym	X	X	X				

Total No. of Samples: 4

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X		

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/17/2023	FedEx 20:30	J. Hereford	10/18/23	10:55
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
RM-3-A	Built-up roofing material L1: Up to 3/8-inch thick built-up roofing materials	Roof 3 - Roof over building L		X	X				
	L2: 1/2-inch thick gypsum board		X						
	L3: Felt paper associated with up to 10-inch thick foam insulation			X	X				
	L4: Tar paper/mastic on metal deck			X	X				
RM-3-B	↓	Roof 3 - Roof over building L	X	X	X				
RF-1-A	Roof flashing/mastic	Roof 3 - Roof over building L		X	X				
RF-1-B	↓	↓		X	X				
PMA-1-A	Mastic on gray caulk around pipe associated with HVAC units	Roof 3 - Roof over building L							
PMA-1-B	↓	↓							

Total No. of Samples: 6

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X		

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/17/2023	FedEx 20:30	J. Nerestich	10/18/23	10:55
Company: LANGAN			Company: Amerisci		

Laboratory Name: AmeriSci, NY, NY

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

3 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
HC-1-A	Caulking associated with rooftop HVAC units	Roof 3 - Roof over building L		X	X				
HC-1-B	↓	↓		X	X				
RM-4-A	Built-up roofing material L1: Up to 1/4-inch thick built-up roofing materials	Roof 4 - Roof over buildings J-F connector		X	X				
	L2: Tar paper under plywood			X	X				
RM-4-B	↓	Roof 4 - Roof over buildings J-F connector		X	X				
RF-2-A	Roof flashing/mastic	Roof 4 - Roof over buildings J-F connector		X	X				
RF-2-B	↓	↓		X	X				
PC-1-A	Pipe cover material under buildings J-F connector	Roof 4 - Roof over buildings J-F connector		X	X				
PC-1-B	↓	↓		X	X				

Total No. of Samples: 8

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X		

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/17/2023	FedEx 20:30	J. Werrtich	10/18/23	10:55
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

2 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
RM-5-A	Built-up roofing material Up to 3/8-inch thick built-up roofing materials	Roof 5 - Roof over cafeteria		X	X				
	L1: L2: 1/2-inch thick gypsum board		X						
	L3: Felt paper associated with up to 6-inch thick foam insulation			X	X				
	L4: Tar paper/mastic on metal deck			X	X				
RM-5-B	↓	Roof 5 - Roof over cafeteria	X	X	X				
SDC-1-A	Black material associated with silver lining on fiberglass duct insulation	Roof 5 - Roof over cafeteria		X	X				
SDC-1-B	↓	↓		X	X				
RM-6-A	Up to 1/2-inch thick built-up roofing material under up to 1-inch gravels	Roof 6 - Canopy roof between buildings F & K		X	X				
RM-6-B	↓	↓		X	X				

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
				X		

Total No. of Samples: 6

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Sanjay Patel	Date:	Time:	Received by:	Date:	Time:
	SPatel	10/17/2023	FedEx 20:30	J. Neretich	10/18/23	10:55
Company: LANGAN				Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

5 of 6

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216		
	Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
RM-7-A	L1: Up to 3/8-inch thick built-up roofing material under up to 1.5-inch gravels	Roof 7 - Canopy roof by main entrance		X	X				
	L2: 1/8-inch thick roofing membrane under 2-inch thick press wood insulation on wood deck			X	X				
RM-7-B	↓	Roof 7 - Canopy roof by main entrance		X	X				
RF-3-A	Roof flashing/mastic	Roof 7 - Canopy roof by main entrance		X	X				
RF-3-B	↓	↓		X	X				
RM-8-A	L1: Up to 1/4-inch thick built-up roofing material under up to 1.5-inch gravels	Roof 8 - Canopy roof by auditorium		X	X				
	L2: Felt paper associated with up to 4-inch thick foam insulation on wood deck			X	X				
RM-8-A	↓	Roof 8 - Canopy roof by auditorium		X	X				
CFC-1-A	Counter flash caulking	Roof 9 - Canopy roof by gymnasium		X	X				
CFC-1-B	↓	↓		X	X				

Turnaround Request:	6 hours	12 hours	24 hours	48 hours	72 hours	5 days
				X		

Total No. of Samples: 8

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Sanjay Patel	Date:	Time:	Received by:	Date:	Time:
		10/17/2023	FedEx 20:30	J. Merkich	10/18/23	10:55
Company: **LANGAN**				Company: Amerisci		

Laboratory Name: AmeriSci, NY, NY

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

223102507

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216 Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
RM-9-A	Built-up roofing material Up to 1/2-inch thick built-up roofing materials	L1: Roof 9 - Canopy roof by gymnasium		X	X				
	L2: 1/2-inch thick gypsum board		X						
	L3: Felt paper associated with up to 2-inch thick foam insulation on wood deck			X	X				
RM-9-B	↓	Roof 9 - Canopy roof by gymnasium	X	X	X				
RF-4-A	Roof flashing/mastic	Roof 9 - Canopy roof by gymnasium		X	X				
RF-4-B	↓	↓		X	X				

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X		

Total No. of Samples: 4

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/17/2023	FedEx 20:30	S. Veretich	10/18/23	10:55
Company: LANGAN			Company: AmeriSci		

Laboratory Name: AmeriSci, NY, NY

A P P E N D I X B

Laboratory Results and Chain-of-Custody Documentation (PCBs)

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Analysis Report

October 25, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	CN, SP	10/17/23	
Location Code:	LANGANNJ	Received by:	SR1	10/18/23	10:51
Rush Request:	48 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP27987
Phoenix ID: CP27987

Project ID: 101061220 HORACE GREELEY HIGH SCHOOL
Client ID: HC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				10/23/23	B/R/RB	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1221	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1232	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1242	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1248	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1254	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1260	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1262	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
PCB-1268	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	
Total PCBs	ND	470	ug/Kg	2	10/25/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	35		%	2	10/25/23	SC	30 - 150 %	
% DCBP (Confirmation)	37		%	2	10/25/23	SC	30 - 150 %	
% TCMX	18		%	2	10/25/23	SC	30 - 150 %	3
% TCMX (Confirmation)	20		%	2	10/25/23	SC	30 - 150 %	3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.
3 = This parameter exceeds laboratory specified limits.

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:

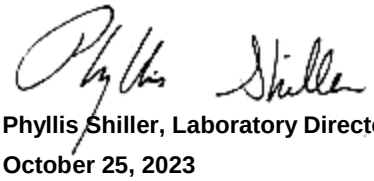
Results are reported on an ``as received`` basis, and are not corrected for dry weight.

PCB Comment:
Poor surrogate recovery was observed for PCBs. Sample was re-extracted with similar results.

PCB Comment:
For PCBs, in order to reach the desired RL, multiple cleanup steps were performed. The extract was cleaned up with a combination of sulfuric acid, potassium permanganate, copper powder and additional florisil.

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.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 25, 2023
Official Report Release To Follow

PHOENIX
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

October 25, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	CN, SP	10/17/23	
Location Code:	LANGANNJ	Received by:	SR1	10/18/23	10:51
Rush Request:	48 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP27987
Phoenix ID: CP27988

Project ID: 101061220 HORACE GREELEY HIGH SCHOOL
Client ID: CFC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				10/20/23	B/R/AC1	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1221	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1232	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1242	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1248	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1254	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1260	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1262	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
PCB-1268	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	
Total PCBs	ND	790	ug/Kg	5	10/23/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	44		%	5	10/23/23	SC	30 - 150 %	
% DCBP (Confirmation)	40		%	5	10/23/23	SC	30 - 150 %	
% TCMX	41		%	5	10/23/23	SC	30 - 150 %	
% TCMX (Confirmation)	40		%	5	10/23/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

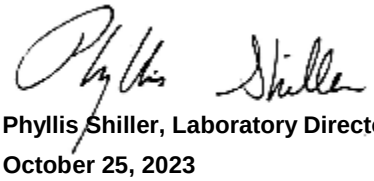
RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

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.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 25, 2023
Official Report Release To Follow

Sample Criteria Exceedances Report

GCP27987 - LANGANNJ

Criteria: None

State: NY

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

16.3°C
WCIP

1 of 1

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Horace Greeley High School		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/17/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216 Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
HC-1	Composite sample of caulking associated with HVAC units	Roof 3 - Roof over building L						X	27987
CFC-1	Composite sample of caulking associated with metal counter flash	Roof 9 - Canopy roof by gymnasium						X	27980

Total No. of Samples: 02

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
			X		

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/17/2023	FedEx 20:30	Fedex Emily A	10/18/23	1051
Company: **LANGAN**			Company		

Laboratory Name: Phoenix Env. Lab., Manchester, CT

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Analysis Report

October 25, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	SP, CN	10/16/23	
Location Code:	LANGANNJ	Received by:	SR1	10/17/23	9:55
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP27004
Phoenix ID: CP27004

Project ID: 101061220 HORACE GREELEY HIGH SCHOOL
Client ID: DC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				10/23/23	B/R/RB	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1221	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1232	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1242	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1248	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1254	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1260	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1262	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
PCB-1268	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	
Total PCBs	ND	810	ug/Kg	5	10/24/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	33		%	5	10/24/23	SC	30 - 150 %	
% DCBP (Confirmation)	35		%	5	10/24/23	SC	30 - 150 %	
% TCMX	36		%	5	10/24/23	SC	30 - 150 %	
% TCMX (Confirmation)	40		%	5	10/24/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

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:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

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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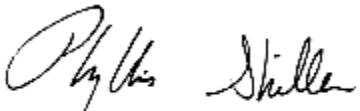

Phyllis Shiller, Laboratory Director
October 25, 2023
Official Report Release To Follow

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Analysis Report

October 25, 2023

FOR: Attn: Vijay Patel
Langan Engineering & Environmental Svcs
300 Kimball Drive
4th Floor
Parsippany NJ 07054

Sample Information		Custody Information		Date	Time
Matrix:	CAULK	Collected by:	SP, CN	10/16/23	
Location Code:	LANGANNJ	Received by:	SR1	10/17/23	9:55
Rush Request:	5 Day	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCP27004
Phoenix ID: CP27005

Project ID: 101061220 HORACE GREELEY HIGH SCHOOL
Client ID: MSC-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Caulk Extraction for PCB	Completed				10/22/23	R/HL	SW3540C	
Polychlorinated Biphenyls								
PCB-1016	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1221	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1232	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1242	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1248	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1254	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1260	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1262	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
PCB-1268	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	
Total PCBs	ND	570	ug/Kg	1	10/23/23	SC	SW8082A	1
QA/QC Surrogates								
% DCBP	52		%	1	10/23/23	SC	30 - 150 %	
% DCBP (Confirmation)	66		%	1	10/23/23	SC	30 - 150 %	
% TCMX	39		%	1	10/23/23	SC	30 - 150 %	
% TCMX (Confirmation)	47		%	1	10/23/23	SC	30 - 150 %	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

1 = This parameter is not certified by the primary accrediting authority (NY NELAC) for this matrix. NY NELAC does not offer certification for all parameters at this time.

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:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

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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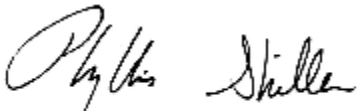

Phyllis Shiller, Laboratory Director
October 25, 2023
Official Report Release To Follow

Sample Criteria Exceedances Report

GCP27004 - LANGANNJ

Criteria: None

State: NY

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

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17.8° NIC

1 of 1

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Horace Greeley High School - Telescope Building		
Address:	70 Roaring Brook Rd, Chappaqua, NY 10514	Auth. By:	Vijay Patel
		Phone No:	973-560-4983
Langan Job No.:	101061220	Sampling Date:	10/16/2023
Sampled By/License #:	SANJAY PATEL / NYC115945/NYS98-10216 Craig Napolitano NYS 95-10994/NYC 113931		

Sample ID Number	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
DC-1	Composite sample of caulking associated with door components	Telescope Building - Perimeter walls						X	27004
MSC-1	Composite sample of caulking associated with metal sheets joints around the Dome	Telescope Building - Dome - Interior/exterior						X	27005

Total No. of Samples: 2

Turnaround Request:

6 hours	12 hours	24 hours	48 hours	72 hours	5 days
				X	

Laboratory Instructions: **Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to spatel@langan.com and vpatel@langan.com.**

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
Sanjay Patel	10/16/2023	FedEx 18:15		10/17/23	9:55
Company: LANGAN			Company: Phoenix Env. Labs		

Laboratory Name: Phoenix Env. Lab., Manchester, CT

A P P E N D I X C

Langan's Certifications and Laboratory Accreditations

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive, 4th Floor, Parsippany, NJ, 07054

License Number: 70336
License Class: RESTRICTED
Date of Issue: 02/17/2023
Expiration Date: 03/31/2024
Duly Authorized Representative: Vijay Patel

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

STATE OF NEW YORK - DEPARTMENT OF LABOR

ASBESTOS CERTIFICATE

SANJAYKUMAR PATEL

CLASS(EXPIRES)

C ATEC (09/24) D INSP (09/24)

H PM (09/24)

CERT# 23-61FHZ-SHAB

DMV# 587051083

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 00691802308

IF FOUND, RETURN TO:

NYSDOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12226

United States Environmental Protection Agency

This is to certify that

Sanjaykumar B Patel

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 November 20, 2024

LBP-R-4543-2

Certification #

June 04, 2021

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

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

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2023-07-01 through 2024-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

NEW YORK STATE OF OPPORTUNITY. Department of Health

KATHY HOCHUL
Governor

JAMES V. McDONALD, M.D., M.P.H.
Acting Commissioner

MEGAN E. BALDWIN
Acting Executive Deputy Commissioner

LAB ID: 11480

March 30, 2023

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

Certificate Expiration Date:
April 01, 2024

Dear Ms. Lu,

Enclosed are certificate(s) of approval issued to your environmental laboratory for the current permit year. The certificate(s) supersede(s) any previously issued one(s) and is(are) in effect through the expiration date listed. Please carefully examine the certificate(s) to insure that the categories, subcategories, analytes, and methods for which your laboratory is approved are correct. In addition, verify that your laboratory's name, address, lead technical director, and identification number are accurate.

Pursuant to NYCRR Subpart 55-2.2, original certificates must be posted conspicuously in the laboratory and copies shall be made available to any client of the laboratory upon request.

Pursuant to NYCRR Subpart 55-2.6, any misrepresentation of the fields of accreditation (category - method - analyte) for which your laboratory is approved may result in denial, suspension, or revocation of your certification. Any use of the Environmental Laboratory Approval Program (ELAP) or National Environmental Laboratory Accreditation Program (NELAP) name, reference to the laboratory's approval status, and/or using the NELAP logo in any catalogs, advertising, business solicitations, proposals, quotations, laboratory analytical reports, or other materials must include the laboratory's ELAP identification number and distinguish between testing for which the laboratory is approved and testing for which the laboratory is not approved.

If you have any questions, please contact us at the Environmental Laboratory Approval Program, Wadsworth Center, New York State Department of Health, Empire State Plaza, Albany NY, 12237; by phone at (518) 485-5570; by facsimile at (518) 485-5568; and by email at elap@health.ny.gov.

Sincerely,

Amy J. Steuerwald

Amy J. Steuerwald, Ph.D.
Director, Environmental Laboratory Approval Program

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2024
Issued April 01, 2022
Revised March 30, 2023

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

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

Serial No.: 66402

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

A P P E N D I X D

File Search/Archive Materials
Scope of Work Drawings

CHAPPAQUA CENTRAL SCHOOL DISTRICT

DISTRICT-WIDE CAPITAL IMPROVEMENTS - HIGH SCHOOL

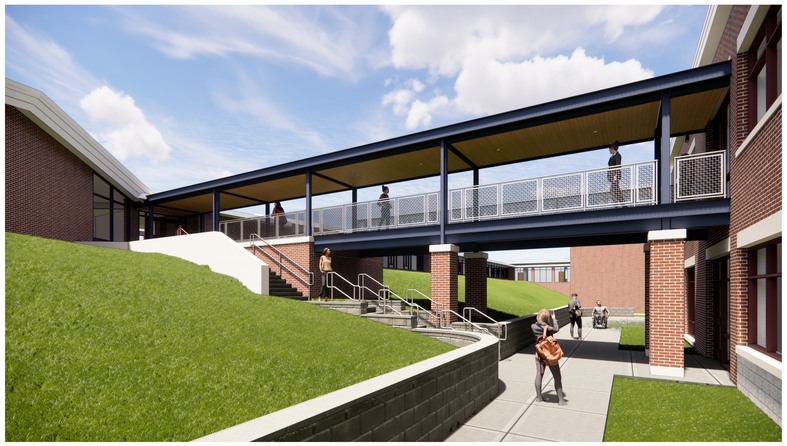
66 Roaring Brook Rd Chappaqua, NY 10514

AUGUST 31, 2023

DISTRICT-WIDE CAPITAL IMPROVEMENTS - HIGH SCHOOL
NYSED Project Control No.
HG: 66-10-04-06-0-015-023
AP: 66-10-04-06-7-052-001
CS: 66-10-04-06-7-027-002
OB: 66-10-04-06-0-026-002

KG+D Project No.
2023-1028

DESIGN DEVELOPMENT



HORACE GREELEY HIGH SCHOOL
7O Roaring Brook Road,
Chappaqua, NY 10514
NYSED Control No.
66-10-04-06-0-015-023

HORACE GREELEY ATHLETIC PAVILION
7O Roaring Brook Road,
Chappaqua, NY 10514
NYSED Control No.
66-10-04-06-7-052-001

Exp. 01-31-2024

LIST OF DRAWINGS

G000	COVER SHEET
CIVIL	
SP-HG-1	HORACE GREELEY HIGH SCHOOL SITE IMPROVEMENT PLAN
SP-HG-2.1	HORACE GREELEY SITE PART PLANS
SP-HG-3.1	SITE DETAILS
SP-HG-3.2	SITE DETAILS
STRUCTURAL	
S001-HG	GENERAL NOTES & MATERIAL SPECIFICATIONS
S101-HG	HORACE GREELEY F-J BRIDGE PARTIAL FOUNDATION, FLOOR & ROOF PLAN
S102-HG	SECTIONS
S103-HG	FITNESS & GYM ROOF PLAN
S104-HG	GYM ROOF PLAN
S105-HG	L BUILDING ROOF PLAN
S200-HG	TYPICAL DETAILS
S001-AP	GENERAL NOTES & MATERIAL SPECIFICATIONS
S101-AP	FIRST FLOOR SLAB-ON-GRADE & FOUNDATION PLAN
S102-AP	MEZZANINE & LOW ROOF FRAMING PLAN
S103-AP	ROOF FRAMING PLAN
S201-AP	FOUNDATION SCHEDULES & TYPICAL DETAILS
S202-AP	FOUNDATION SCHEDULES & TYPICAL DETAILS
S210-AP	ATHLETIC PAVILION FOUNDATION SECTIONS
S310-AP	ATHLETIC PAVILION FRAMING SECTIONS
S401-AP	MASONRY SCHEDULE & TYPICAL DETAILS
ARCHITECTURAL	
A201-HS	HORACE GREELEY HIGH SCHOOL ROOF PLAN
A202-HS	HORACE GRELEEY HIGH SCHOOL ROOF DETAILS
A203-HS	HORACE GREELEY HIGH SCHOOL ROOF DETAILS
A201-HG	HORACE GREELEY F-J BRIDGE PLANS
A202-HG	HORACE GREELEY F-J BRIDGE ELEVATIONS & SECTIONS
A203-HG	HORACE GREELEY F-J BRIDGE CEILING PLANS
A204-HG	HORACE GREELEY AUDITORIUM LIGHTING
A201-AP	ATHLETIC PAVILION PLANS
A202-AP	ATHLETIC PAVILION PLANS & ELEVATIONS
A203-AP	ATHLETIC PAVILION SCHEDULES
PLUMBING	
P201-AP	ATHLETIC PAVILION FLOOR PLAN
MECHANICAL	
H101-HG	LEGEND, NOTES, MAIN GYMNASIUM FLOOR PLAN (REMOVALS)
H102-HG	GYMNASIUM & FITNESS ROOM FLOOR PLANS & NOTES (REMOVALS)
H103-HG	CAFETERIA FLOOR PLAN & NOTES (REMOVALS)
H104-HG	L-BLDG MAIN LEVEL PLAN & NOTES (REMOVALS)
H201-HG	MAIN GYMNASIUM FLOOR PLAN
H202-HG	GYMNASIUM & FITNESS ROOM FLOOR PLANS & NOTES
H203-HG	CAFETERIA FLOOR PLAN & NOTES (NEW WORK)
H204-HG	L-BLDG MAIN LEVEL PLAN & NOTES (NEW WORK)
H205-HG	L-BLDG FIRST FLOOR PLAN & NOTES
H206-HG	ATHLETIC PAVILION FLOOR PLAN
H301-HG	HORACE GREELEY HIGH SCHOOL SCHEDULES
H401-HG	HORACE GREELEY HIGH SCHOOL DETAILS
ELECTRICAL	
E001-HG	NOTES, LEGENDS & ABBREVIATIONS
E101-HG	HORACE GREELEY BUILDING A REMOVALS
E102-HG	HORACE GREELEY BUILDING B REMOVALS
E103-HG	HORACE GREELEY BUILDINGS C & D REMOVALS
E104-HG	HORACE GREELEY BUILDING L & D REMOVALS
E105-HG	HORACE GREELEY BUILDING L REMOVALS
E106-HG	HORACE GREELEY BUILDING J REMOVALS
E107-HG	HORACE GREELEY BUILDING K REMOVALS
E108-HG	HORACE GREELEY BUILDINGS G & M REMOVALS
E109-HG	HORACE GREELEY BUILDING H REMOVALS
E110-HG	HORACE GREELEY BUILDING L LOWER LEVEL REMOVAL
E301-HG	HORACE GREELEY BUILDING A POWER PLAN
E302-HG	HORACE GREELEY BUILDING B POWER PLAN
E303-HG	HORACE GREELEY BUILDINGS C & D POWER PLAN
E304-HG	HORACE GREELEY BUILDING L & D POWER PLAN
E305-HG	HORACE GREELEY BUILDING L FIRST FLOOR PART PLAN
E306-HG	HORACE GREELEY BUILDING J POWER PLAN
E307-HG	HORACE GREELEY BUILDING K POWER PLAN
E308-HG	HORACE GREELEY BUILDINGS G & M POWER PLAN
E309-HG	HORACE GREELEY BUILDING H POWER PLAN
E310-HG	HORACE GREELEY BUILDING L LOWER LEVEL POWER PLAN
E311-HG	HORACE GREELEY BUILDING J LOWER LEVEL POWER PLAN
E312-HG	HORACE GREELEY BUILDING H & K LOWER LEVEL POWER PLAN
E313-HG	HORACE GREELEY ATHLETIC PAVILION POWER PLAN
E314-HG	HORACE GREELEY PARTIAL LOWER LEVEL
E315-HG	HORACE GREELEY PARTIAL SITE PLAN

Sheet total: 70

PROJECT SCOPE DESCRIPTION

PAVING PROJECTS
- -REPAVE UPPER LOT BEHIND K BUILDING, EXCLUDING SIDEWALKS & CURBS
- -REPAVE FIELD SERVICE ROAD

NEW BUILDING - HGHS ATHLETIC PAVILION
- -2,910sf FIELD RESTROOM, SNACK STAND & STORAGE BUILDING

NEW ADDITION
- -F-J BRIDGE REPLACEMENT

AUDITORIUM LIGHTING

ROOF REPLACEMENT
- -BASE SCOPE: REPLACE WALKWAY CANOPY ROOFS AT GYM & CAFETERIA CANOPY
- -ADD ALTERNATE No.1: PRICE TO REPLACE WALKWAY CANOPY ROOF AT CLASSROOMS
- -ADD ALTERNATE No.2: PRICE TO REPLACE WALKWAY CANOPY ROOF AT STEAM CENTER
- -ADD ALTERNATE No.3: ADDITIONAL LIMITED ROOF REPLACEMENT AT K BUILDING

HVAC UPGRADES
- -L BUILDING A/C
- -CAFETERIA A/C
- -GYM A/C

ELEC UPGRADES
- -REPLACE BOILER RM DISTRIBUTION BOARD & DAMAGED FEEDER CABLE TO GYM BLDG
- -REPLACE FIRE ALARM
- -REPLACE TENNIS COURT LIGHTS

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COVER SHEET

G000

AHERA 3-YEAR RE-INSPECTION REPORT
AND MANAGEMENT PLAN
of
ASBESTOS CONTAINING MATERIALS

Performed at:

HORACE GREELEY HIGH SCHOOL

Performed for:

CHAPPAQUA
Central School District

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, NY 10514

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1.0 SCOPE OF WORK

On October 30, 1987, the U.S. Government issued a final rule under Section 203 of Title II of the Toxic Substances Control Act (TSCA) entitled Asbestos Containing Materials in Schools, 40 CFR Part 763 (as amended through December 31, 2002). The Environmental Protection Agency (EPA) was charged with enforcing this ruling, which was the result of federal legislation known as the Asbestos Hazard Emergency Response Act (AHERA). This action represented a substantial expansion of the 1982 version of 40 CFR Part 763, and placed following additional burdens on the Local Education Agency (LEA):

- All local education agencies (LEAs) identify ACBM in their school buildings. Once doing so, the LEAs must submit a Management Plan to the State Education Department by October 12, 1988.

- At least once every six months after the Management Plan is in effect; the LEA Designee shall conduct a periodic surveillance in each school building containing ACBM. Non-accredited personnel may perform the periodic surveillance. The surveillance requires that a visual inspection of all areas that have been identified in the Management Plan as ACBM be conducted and any changes in the condition of the ACBM be noted. This information shall be recorded as well as the date and the name of the person performing the surveillance. This information should be submitted to Designated Person to be included in the Management Plan.

- At least once every three years, the LEA must have a re-inspection of its building. The re-inspection must be performed by an accredited inspector who should recheck all ACBM or assumed ACBM and reassess any changes in its condition. This information should be included within the Management Plan.

WSP has been retained by Chappaqua Central School District (CCSD) to perform the 2022 AHERA 3-year re-inspection of their school district. The re-inspection process consists of four phases prior to final submission. The four phases are: 1) management plan review, 2) field inspection, 3) update of the original management plan, and 4) review of the new, updated management plan with the LEA Designee of the school district.

1.1 ORIGINAL MANAGEMENT PLAN REVIEW

The initial phase requires the accredited inspector and/or management planner to review the original management plan. The inspector ascertains for each school building in the district, all the materials that were assumed or confirmed to contain asbestos through bulk sample analysis. The locations, material type (surfacing, thermal system insulation (TSI), or miscellaneous), and quantities for each homogeneous area are identified.

Based on the information compiled during the management plan review provided by the school district, the inspector then develops a field re-inspection form which will be utilized in phase 2 (field inspection).

1.2 FIELD INSPECTION

The second phase is the actual inspection of the materials assumed or confirmed to contain asbestos in the original management plan for each building. The inspector enters a space, which was shown to contain asbestos during the original inspection. The inspector determines if the ACBM(s) is still present in the room or if it has been abated. If the ACBM(s) is still present, the inspector confirms the quantity of material(s), checks to see if the material(s) is friable and observes the condition of the material(s) for damage. This information is then recorded on the field inspection forms. Additionally, any useful information, which may be used in updating the management plan, is noted. The inspector continues the process throughout each school building.

If during the inspection the inspector observes any previously unidentified suspect materials, a bulk sample may be collected to determine if the material contains asbestos. Bulk samples are taken only with the approval of the LEA Designee of the school district. If bulk samples are not collected, then the material is assumed to contain asbestos.

On June 7, 2022 an AHERA re-inspection of the Chappaqua CSD schools was performed by the following NYS/AHERA accredited inspector(s).

Name	NYSDOL #	Exp. Date
Williams Ng-Feng	14-09012	**04/23**
Dmitri Kirnossenko	07-01720	**08/22**

The management plan was developed by the following NYS/AHERA accredited Management Planner(s):

Name	NYSDOL #	Exp. Date
Alexander Smolyar	12-07624	**10/23**

Note: Copies of current certificates are included in Appendix 6.

This inspection report updates the information and conditions on all ACBM described and assessed in the original report(s). In addition, any ACBM which was not identified in the original inspection but was discovered during this survey has been included in this report.

1.3 UPDATE OF THE ORIGINAL MANAGEMENT PLAN

The third phase of the re-inspection is updating the original management plan. The management plan is written by a state certified management planner. The inspector sorts the data collected during the actual inspection into tabulated forms based on the space I.D. # and the type of material. The Management Planner then determines the necessary response actions required to be taken by the school district in order to maintain the ACBM and develops the new, updated management plan.

1.4 UPDATE MANAGEMENT PLAN REVIEW WITH DISTRICT LEA DESIGNEE

The fourth phase of the re-inspection is a review of the updated management plan with the school district's LEA Designee in order to familiarize the LEA Designee with the information contained in the management plan. The Management Planner and the LEA Designee review the data collected and the response actions recommended. Any appropriate recommendations made by the LEA Designee are incorporated into the management plan before final submission. The LEA Designee then signs the final copy of the management plan.

In the future, the Management Plan must be updated whenever an abatement of ACBMs is performed. The six-month periodic surveillance of the school district is still required after the re-inspection.

In New York State, the School Asbestos Safety Act (SASA) located in the New York State Education Law Sections 430 through 437, also requires the LEA for the District to re-inspect the buildings for ACBM every three years. SASA requires the LEA to submit the AHERA 3-year re-inspection data to the New York State Education Department via electronic reporting form. These forms are generally supplied to the District at the beginning of the re-inspection with dates when the re-inspection must be completed and submitted by.

This 3-year re-inspection cannot accurately determine all ACM that may be present in or behind walls, ceilings and floors. Before the start of any renovation project, existing plans and specifications regarding the building materials used in construction (i.e. plaster materials, gypsum board, pipe insulation, etc.) should be reviewed. If necessary, access holes may be made in the walls, ceilings and/or floor to look for ACM pipe insulation. Properly trained personnel should perform this work. If a suspect material is found, bulk sampling should be conducted prior to construction to protect workers from possible exposure and contamination.

During the original inspection, not all varieties of floor tiles used in the buildings were sampled and analyzed. Some floor tiles were assumed to contain asbestos. These tiles are non-friable as long as they remain in good condition. The floor tile, floor tile mastic, and/or the under lying felt paper must be sampled prior to any renovation or removal project which will disturb the materials.

Fire doors have also been assumed to contain asbestos in the core as a fire retardant. If the doors are to be removed, drilled or affected where the interior would be exposed, the necessary precautions should be taken.

Roofing materials, which are not covered by the 3-year re-inspection, should be considered as suspect materials. Core samples down to the substrate of all homogeneous roofing materials should be collected and analyzed for asbestos before the start of any renovation project.

Bulk sample collection must be conducted by a NYSDOL licensed inspector(s) with valid certificate(s), and an ELAP accredited laboratory should perform all bulk sample analysis.

The Operations and Maintenance Plan found in Section 4.0 of the management plan must be kept up to date. It contains important information for working with and maintaining materials that contain asbestos.

2.0 SITE DESCRIPTION

Horace Greeley High School
70 Roaring Brook Road
Chappaqua, New York 10514
Number of Levels: Two (2) Levels
Re-inspection Date(s): June 7, 2022
Building Contains: Friable and Non-Friable

3.0 ASSESSMENT OF ACBM

3.1 ACBM CATEGORIES

The ACBM's at the school were inspected and described in each building space accessible by nondestructive means. The inspector(s) assessed all friable known or assumed ACBM in the school building in accordance with 40 CFR Part 763.88. In addition, all other non-friable ACBM were also assessed. Hazardous Assessment form, which is located in Appendix 3, lists a space by space description of the ACBM and their appropriate response actions.

The ACBM and assumed ACBM were classified according to these categories in 40 CFR Part 763.88:

1. **DAMAGED OR SIGNIFICANTLY DAMAGED THERMAL SYSTEM INSULATION (TSI).** Plumbing and HVAC mechanical equipment insulation with greater than 1 percent damage;

2. **DAMAGED FRIABLE SURFACING ACBM.** Sprayed or troweled on coating material applied to interior structural components. Damaged less than 10 percent (evenly distributed throughout the material) or 25 percent (localized);

3. **SIGNIFICANTLY DAMAGED FRIABLE SURFACING ACBM.** Same description as No. 2 with damage extent greater than 10 percent (distributed) or 25 percent (localized);

4. **DAMAGED OR SIGNIFICANTLY DAMAGED FRIABLE MISCELLANEOUS ACBM.** Friable ACBM, excluding thermal system insulation or surfacing material with damage greater than 1 percent;

5. **ACBM WITH POTENTIAL FOR DAMAGE.** Material susceptible to physical, water or other damages;

6. **ACBM WITH THE POTENTIAL FOR SIGNIFICANT DAMAGE.** Material easily susceptible to physical, water or other damages;

7. **ANY REMAINING FRIABLE ACBM OR FRIABLE SUSPECTED ACBM.**

The ACBM's in each functional space were assessed as to the location and quantity of material, friability, severity of damage (percentage of total amount), extent of damage (scattered or localized), and type of damage (flaking, blistering, water damage or other signs of physical damage). Other considerations that were taken into account included whether the material was accessible, the material's potential for disturbance, known or suspected causes of damage (e.g., air erosion, vandalism, vibration, water, etc.), and preventive measures which might eliminate the reasonable likelihood of undamaged ACM from becoming significantly damaged.

3.2 RESPONSE ACTIONS

According to 40 CFR Part 763.88(d), the LEA shall select a person fully accredited to develop management plans. NYS and AHERA accredited personnel reviewed the results of the inspection and assessment for the facility. When choosing among the various response actions, a number of factors were taken into consideration including, but not limited to, damage, potential for damage, type of material, and any planned renovations or change of use for the building area. The response actions were planned following a 2 fold strategy. First, in order to eliminate any imminent health risk, all areas which contain significantly damaged ACBM will be abated in a timely fashion. The second series of response actions are to repair, or abate where repair is not feasible, damaged ACBM. The final series of response actions are primarily precautionary steps to ensure that damage is not inflicted upon ACBM which currently exists in an intact state. The specific action taken will depend upon accessibility of the area, current occupancy, and the degree of any possible air erosion. These areas, as well as all remaining ACBM, shall be under constant surveillance until the material is ultimately removed.

Hazardous Assessment Form identifies the recommended appropriate response actions on a space by space basis. At a minimum, the response actions conform with 40 CFR Part 763.90. These response actions are consistent with the assessments and are intended to protect human health and the environment.

Hazardous Assessment Form, found in Appendix 4 of this report, list the response actions in the form of these three response action codes:

1. **REMOVAL**
2. **REPAIR**
3. **OPERATIONS & MAINTENANCE (O&M)**

Combinations of response action codes for each functional space represent the recommended actions to be performed in order to comply with minimum responses outlined under 40 CFR Part 763.90. It is the LEA's responsibility to ensure implementation of the appropriate response action consistent with the assessment findings. The LEA shall arrange to have the actions designed and completed by NYS and EPA accredited persons. The LEA shall select those response actions which protect human health and the environment, according to the least burdensome method.

If damaged or significantly damaged asbestos containing TSI is present, the LEA must at least clean the area surrounding the damage and repair the damage points. It is recommended that all TSI be included in an Operations and Maintenance (O&M) program according to 40 CFR Part 763.91 and as part of the management plan. Removal of asbestos containing TSI is recommended whenever economically feasible or when school renovation and/or demolition may impact on the material.

If damaged friable surfacing ACBM or damaged friable miscellaneous ACBM has been identified, the LEA may choose encapsulation, enclosure, removal or repair of the damaged material. The AHERA regulation requires the LEA to determine which of the appropriate response actions best protects human health and the environment. The LEA may then determine the least burdensome

response action based on local circumstances such as building occupancy and use patterns and economic concerns such as short and long term costs. Wherever this material has been repaired, encapsulated or enclosed, the LEA should implement an O&M program until the material has been removed.

If significantly damaged friable surfacing or miscellaneous ACBM is present, the LEA shall determine whether there is a need to isolate and/or restrict access to the functional space. The LEA must then encapsulate, enclose or remove as necessary to protect human health and the environment. Where material has been repaired, encapsulated or enclosed, the LEA shall implement an O&M program until the material has been removed.

If any surfacing, thermal system or miscellaneous ACBM that has the potential for damage is present in the school building, the LEA shall implement an O&M program. The LEA should take preventative measures as part of the management plan to eliminate the likelihood that the ACBM or its protective cover shall be disturbed, damaged, deteriorated or delaminated.

If any surfacing, thermal or miscellaneous ACBM that has the potential for significant damage is present in the school building, the LEA shall implement an O&M program. The LEA should take preventative measures as part of the management plan to eliminate the likelihood that the ACBM or its protective coating shall be disturbed, damaged, deteriorated or delaminated. These measures must remain in place until the material has been removed.

If the appropriate preventative measures cannot be effectively implemented, the LEA should determine whether there is a need for the functional space to be isolated and access to it restricted. The ACBM should be removed, or other acceptable abatement action taken, as soon as possible to protect human health and the environment.

Asbestos abatement actions other than small scale, short duration repairs as defined under AHERA and according to New York State requirements must be designed by persons accredited to design response actions. All asbestos abatement activities shall be performed according to federal, state and local regulations.

3.3 ADDITIONAL INSPECTION AND ASSESSMENT CONDITIONS

In addition to the information included in this report, the LEA should be aware of the following:

A. Any building materials on the exterior of the building, structural building materials, such as cinderblock, and undiscovered materials are not part of this AHERA inspection. Prior to any disturbance of the above materials, samples shall be collected and analyzed for asbestos content by a licensed inspector and an accredited laboratory. Materials defined as undiscovered shall include all suspected ACBM in concealed spaces and those not identified in the functional spaces inspected.

B. All future building materials -- mastics, adhesives, building components -- to become part of the building structure should be checked for asbestos content.

C. All materials in the AHERA survey which were assumed to contain asbestos should be re-sampled and analyzed by a licensed inspector and an accredited laboratory prior to any disturbance thereof.

D. The descriptions of homogenous material types and colors of the materials found in this survey are subjective. Notify the inspector in writing with any questions concerning these descriptions.

E. Square footages, lengths and other dimensional descriptions are approximate and should be verified prior to designing or scheduling any abatement activity.

F. All actions pursuant to AHERA and to all other applicable regulations should be kept up to date at all times within the management plan.

3.4 RE-INSPECTION FINDINGS

A. Horace Greeley High School

The following is a listing of priority areas for the school with recommended response actions. A complete listing of the conditions of all ACM reassessed in the building during inspection can be found in Appendix 3.

1.

Location:	Space I.D # B100P – Plenum Above Auditorium
ACM:	Pipe Fittings
Homogeneous Material:	02
Condition:	Significant Damage
Recommended Response Action:	Remove

2.

Location:	Space I.D # H1010 – Garage Storage Room
ACM:	Pipe Fittings
Homogeneous Material:	02
Condition:	Significant Damage
Recommended Response Action:	Remove

All other areas which contains assumed or confirmed asbestos containing building materials should be maintained under operations and maintenance (O&M) procedures, unless otherwise noted.

4.0 OPERATIONS AND MAINTENANCE PROGRAM

O&M REQUIREMENTS FOR SCHOOL PERSONNEL AND/OR CUSTODIAL STAFF:

In case of a fiber release episode where ACBM or assumed ACBM is damaged or disturbed, the school personnel and/or custodial staff shall contact Buildings & Grounds office at (914) 238-7210 or District LEA Mr. Joseph Gramando at (914) 238-7200 ext. 1201.

O&M REQUIREMENTS FOR ASBESTOS CONTRACTOR PERFORMING O&M WORK:

The asbestos contractor performing O&M work shall adhere to the following program.

The asbestos management program has been revised for the school based on the inspection results. The revised management plan must be kept on school premises and be readily available during normal business hours without cost or other restriction, for inspection by the EPA, state representatives and the general public which includes teachers, other school personnel and their representatives, and parents. The LEA shall adhere to these as well as all other applicable regulatory requirements. The LEA shall initiate an operations and maintenance program whenever ACBM is present in a regulated building (40 CFR Part 763.91). An O&M program outlines the series of work practices required to maintain friable ACBM in good condition, to insure clean up of asbestos fibers previously released, and to prevent further release by minimizing and controlling damage to the ACBM. The elements of an O&M program include notification and labeling, employee training, worker protection and medical surveillance, cleaning and maintenance operations, fiber release episode management, periodic surveillance and record keeping.

The New York State regulations adopted in Title 12 of the Official Compilation of Codes, Rules, and Regulations, Part 56 has been adopted to require appropriate training and certification for those persons employed or contracted to handle asbestos, including the supervision of such actions. The guidelines have set forth standards and procedures that shall be followed when removal, enclosure, encapsulation, repair or disruption of asbestos or asbestos containing materials has occurred. An inspection and enforcement program within the NYSDOL has been established to address such actions. Since Industrial Code Rule 56 applies to public authorities, i.e. the LEA's, it is recommended that a full understanding of the rule be obtained prior to the implementation of the O&M program.

4.1 DEFINITIONS

Abatement: Procedures to control fiber release from asbestos material. This includes removal, encapsulation, enclosure, repair, disturbance of friable asbestos or any handling of asbestos material that may result in the release of asbestos fiber.

Accessible: When referring to ACM, the material is subject to disturbance by school building occupants or custodial or maintenance personnel in the course of their normal activities.

Asbestos Containing Material (ACM): In reference to school buildings, any material containing more than one percent asbestos.

Asbestos Containing Building Material (ACBM): Surfacing ACM, thermal insulation or miscellaneous ACM found in or on interior structural members or other parts of a building.

Asbestos Debris: Fragments of ACBM that can be identified by color, texture or composition. This may include dust if confirmed by a licensed inspector.

ACBM Condition:

Good: No visible damage or deterioration, or showing only very limited damage or deterioration.

Damaged: Physical injury or deterioration such that the internal structure of the material is inadequate, material which has delaminated such that its bond to the substrate is inadequate, or which lacks fiber cohesion or adhesion properties for any other reason. Thermal system insulation (TSI) is considered damaged when it is lacking part or all of its covering. Such damage may be shown by the separation of ACM into layers; flaking, blistering, or crumbling; water damage or stains; scrapes, mars or gouges; exposed TSI beneath its covering.

Significantly Damaged: Damage that is extensive and severe.

Action Level: An airborne concentration of asbestos of 0.1 fibers per cubic centimeter of air calculated as an 8 hour TWA (Time Weighted Average).

AHERA: The Asbestos Hazard Emergency Response Act. Signed into law on October 22, 1986 by former President Ronald Reagan. It required schools to identify asbestos containing materials in buildings, institute programs aimed at minimizing the risk of asbestos exposure in those buildings, and re-inspect those materials at least every three years.

Amosite: (Brown Asbestos) an asbestiform mineral of the amphibole group. It is the second most commonly used form of asbestos in the U.S.

Asbestos: A naturally occurring fibrous incombustible mineral, which is known to be carcinogenic when, inhaled or ingested.

Assessment: Evaluation of the physical condition and potential for damage of all friable ACBM and asbestos-containing thermal system insulation. AHERA requires classification of each

ACBM assessed into one of seven categories based on material type and damage/potential for damage.

Bulk Sample: A small portion of a suspect asbestos containing building material collected by the inspector for laboratory analysis to determine asbestos content.

Chrysotile: (White Asbestos) the only asbestos form mineral of the serpentine group. It is the most common form of asbestos used in buildings.

Contractor: A public authority or any other governmental agency or instrumentality thereof, self employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in any phase of an asbestos project.

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

Encapsulation: The treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers. Two common types of encapsulant are bridging (surface binding) and penetrating.

Enclosure: An airtight, impermeable, permanent barrier around ACBM to prevent the release of fibers.

EPA: The United States Environmental Protection Agency, Region II, Air and Hazardous Material Division. As of 1995, located at 26 Federal Plaza, New York, N.Y. 10278.

Fiber Release Episode: Any uncontrolled or unintentional disturbance of ACBM resulting in visible emissions.

Friable: Material that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. This includes previously non-friable material that after becoming damaged to the extent that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Functional Space: Room or group of rooms, or homogenous area.

High Efficiency Particulate Air (HEPA): Refers to a mechanical filtration system capable of trapping and retaining at least 99.97% of all non-dispersed particles 0.3 microns in equivalent diameter or larger.

Homogeneous Area: An area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

Inspector: Any person who performs the limited tasks involved in the survey, identification, and assessment of the condition of asbestos and asbestos material and the recording and reporting thereof, or who is involved in the collection of bulk samples of asbestos material or suspected asbestos material for laboratory analysis.

LEA: Local Education Agency, the governing authority of a school.

Management Plan: A document that describes all activities planned and undertaken to comply with all regulations, such as building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure to asbestos.

Management Planner: Any person who assesses the hazard posed by the presence of asbestos or asbestos containing material and/or who recommends appropriate response actions and a schedule for such response actions.

Miscellaneous Material: Interior building material on structural components or fixtures such as floor or ceiling tiles.

NESHAP: The National Emission Standards for Hazardous Air Pollutants, EPA rules under the Clean Air Act.

NYSDOL: The New York State Department of Labor.

OSHA: The Occupational Safety and Health Administration. As of 1990, located at 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Operations and Maintenance Program: A program of work practices to maintain ACBM in good condition, to insure clean up of asbestos fibers previously released, and to further prevent fiber release by minimizing and controlling damage to ACBM.

Periodic Surveillance: A visual examination for any change in material condition of ACBM and assumed ACBM in a building.

Personal Protective Equipment: Clothing, head gear, eye protection, footwear and gloves as required.

PLM: Polarized Light Microscopy.

Re-inspection: The re-examination, by an accredited inspector, of a building for which an original inspection was previously performed, including a re-evaluation and response action recommendations by an accredited management planner.

Removal: The taking out or stripping of ACBM from a functional space or substrate.

Repair: A corrective action using specified work practices to return damaged ACBM to an undamaged condition to prevent fiber release.

Response Action: Methods including removal, encapsulation, enclosure, repair, and operations and maintenance that protect human health and the environment from friable ACBM.

Restricted Handler: Any person performing any limited or special tasks in preparation for or ancillary to an asbestos project, such as a carpenter, electrician, plumber, or similar occupation, or any other person who may incidentally disturb asbestos during the course of any employment.

Routine Maintenance: An area, such as a boiler room or mechanical room, that is not normally frequented by students and in which maintenance employees or contract workers regularly conduct maintenance activities.

Space I.D.: Number assigned to a room or space during the original inspection.

Surfacing Material: A material that is sprayed-on, troweled-on, or otherwise applied to surfaces (e.g. acoustical plaster or fireproofing materials on structural members).

Suspect Material: Building material suspected to contain asbestos because of past practices in its manufacture and use.

Thermal System Insulation (TSI): Material applied to pipes, fittings, boilers, breeching, tanks, ducts, etc. generally to prevent heat loss or gain.

4.2 WORKER PROTECTION

A. PROTECTIVE CLOTHING AND DECONTAMINATION PROCEDURES

EPA regulation 40 CFR Part 763.91(b) serves to extend the protection provided by 40 CFR Part 763.121 (school employee protection during asbestos related projects) to any employees performing O&M and repair activities on ACM not covered by OSHA's 29 CFR 1910.1001 and 29 CFR 1926.1101 (General Industry and Construction Standards for Asbestos). These standards shall be adhered to where applicable during all O&M operations involving the disturbance of ACBM.

The employees of the LEA who clean up, repair or otherwise disturb ACBM are required to wear protective clothing and respirators. The protective clothing shall consist of full body disposable coveralls (Tyvek or equivalent). The worker shall remove all street clothes, undergarments, jewelry, watches, etc. before putting on protective clothing. A respirator shall be put on under the hood or head covering and will be the last item removed during decontamination.

Upon completion of the work, workers shall HEPA vacuum and wet wipe the outside of the protective clothing, including the respirator. The protective coveralls shall be removed and placed in 6 mil plastic bags and discarded as asbestos waste. The worker shall shower after removing protective clothing. Workers shall not remove the respirator until they are in the shower and have thoroughly wet their hair and body and washed the exterior of the respirator. Respirator cartridges shall be removed and disposed of as asbestos waste. Protective boots or shoes shall be HEPA vacuumed and wet wiped during decontamination and stored in a 6 mil polyethylene disposable bag and used only for asbestos work. A shower filtration system to filter asbestos fibers from the water shall be used and shall conform with all applicable regulations. Portable shower units are readily available, inexpensive and easy to install and transport.

If showering facilities are not available and if allowable by federal, state and local regulations, the workers shall proceed to remove all street clothing, as described above, and wear two sets of protective clothing. Gloves shall be worn in addition to the respirator. The workers shall duct tape all openings or potential openings to keep out asbestos fibers. Upon completion of the work, workers shall HEPA vacuum and wet wipe the outer layer of coveralls, including the respirator. Upon removal, the outer layer of protective coveralls shall be placed in 6 mil plastic bags and discarded as asbestos waste. With the respirator still on and wearing the second layer, the worker shall proceed to the nearest shower. The workers shall then remove the coveralls and take a complete shower or wash the outside of the respirator, hands, face and arms. The coveralls and respirator cartridges shall be disposed of as asbestos waste. The workers may then re-dress in street clothing.

B. MEDICAL MONITORING PROGRAM

EPA's Worker Protection Rule, 40 CFR Part 763.121, has been set forth to apply to maintenance staff at schools whose activities include operations and maintenance on or around ACBM. Medical monitoring has been specified where ACM exposure is likely to exceed the OSHA Permissible Exposure Level of 0.1 fibers per cubic centimeter of air (f/cc) calculated as an 8 hour Time

Weighted Average (TWA) during the course of work. The program must be provided at the cost of the LEA and consist of the following elements:

i. Preplacement Examination [40 CFR Part 763.121(f)(2)]
To be provided within 30 days of employment and shall include medical history, chest x-ray, and pulmonary function test (PFT).

ii. Annual Examination [40 CFR Part 763.121(j)(3)]
To include an update of the medical history, chest x-ray, (at minimum every five years 29 CFR 1910.1001, Table 2) and PFT.

iii. Termination Examination [40 CFR Part 673.121(j)(4)]
To be provided within 30 days pre- or post- termination date and will include medical history, chest x-ray and PFT.

iv. Medical Records [40 CFR Part 763.121(j)(6)]
Records of employees shall be maintained complete and accurate for at least 20 years. Medical examination records shall be made available for inspection and copying to the EPA, Assistant Secretary of Labor for Occupational Safety and Health, the Director of National Institute for Occupational Safety and Health (NIOSH) and their physicians and medical consultants, and upon the request of an employee or former employee to the physician.

The physician who conducts the medical examination shall provide the required information to the employer along with any other medical information related to occupational exposure to asbestos fibers as per the regulatory requirements.

4.3 RESPIRATORY PROTECTION PROGRAM

Information on the use of respiratory protection as contained in the EPA/NIOSH "Guide to Respiratory Protection for the Asbestos Abatement Industry" (September 1986, EPA 560/OPTS-86-001), available from TSCA Assistance office (T5-799), Office of Toxic Substances, EPA rm E-543, 401 M Street, S.W., Washington DC, 20460.

Respirators shall be provided to all workers performing asbestos related activities. The respirator will be appropriately fit-tested to ensure that it functions effectively for that individual. Each respirator will be supplied with disposable cartridges approved for asbestos dust by NIOSH and will be worn at all times during abatement activities.

A physician must determine that workers are physically fit to wear the respirator while working. A physical exam should be performed and should include complete work history, pulmonary function exam with full chest x-ray in addition to full physical. This procedure is repeated annually thereafter and also within 30 days of an employee's termination. The x-rays administered during the course of this medical exam shall be interpreted by a NIOSH certified B-Reader.

Respirators used shall be approved jointly by NIOSH and Mine Safety and Health Administration (MSHA) as well as all other federal, state and local agencies governing this type of work. All filters

shall be purple or magenta colored canisters with HEPA filers. Respirator filters and any replacement parts must be purchased from the manufacturer. At no time can parts from different respirators be interchanged. The instructions and recommendations of the respirator manufacturer shall be followed concerning decontamination, removal and filter replacement.

Respirators should be inspected before and after each use. Specific items to check during these inspections will depend on the type and manufacturer of the respirator (see owners instruction booklet for proper procedures). Examples of what to inspect include checking the silicone rubber face pieces, straps, flexible hose, intake and exhaust valves, etc.

Each respirator should be cleaned and sanitized after each use. A mild disinfectant soap and water may be used or any other type of product designed for respirator cleaning. After cleaning the respirator should be hung and allowed to air dry before being used again. Respirators should not be stored in a manner that will disfigure or damage the unit. Storage of the unit near corrosive chemicals or strong sunlight will accelerate the deterioration of the face piece.

Each worker who wears a respirator shall be fit tested to ensure a tight seal where the face comes in contact with the mask. Workers who have beards or excessive facial hair will not be able to carry out asbestos related work. One example of a fit test is the qualitative check of the respirator to face seal using a chemical smoke irritant, saccharin or banana oil every six months for each brand and size respirator an employee shall wear. This testing should be carried out by a qualified health/safety professional.

4.4 WORKER TRAINING

The LEA must provide awareness training of at least two hours to maintenance engineers and custodial workers who are employed by the LEA and work in buildings that contain ACBM. This awareness training is required whether or not these individuals work with ACBM. New employees shall be trained within 60 days after they begin work. The training shall include, at a minimum, information about asbestos and its different uses and forms, background concerning health effects associated with asbestos exposure, the locations of ACBM as identified throughout each school building, the recognition of damage, deterioration and delamination which is related to exposure potentials, the name and phone number of the individual who has been designated as the LEA Asbestos Coordinator, and the location of the management plan.

The LEA is also required to provide in depth training to those employees who conduct any activity which will result in the disturbance of ACBM. The training shall include the previously described two hour awareness as well as 14 additional hours. The additional 14 hours shall include, at minimum, descriptions in the proper methods of handling ACBM; proper use of protective equipment such as respirators, disposable clothing, HEPA vacuums, etc.; complete description of the requirements of AHERA and other federal, state and local regulations; and hands-on training in the use of personal, protective equipment and work procedures.

All forms of training provided shall emphasize the necessity to not disturb ACBM during routine maintenance activities. Employees shall be instructed at a minimum to follow these standards:

i. Avoid performing any activities on ACM that may cause abrasion or physical deterioration of the material. This includes sanding, nailing, drilling, cutting or otherwise damaging the material.

ii. Avoid damaging the ACM during maintenance activities **NOT** directly involving the ACM such as installing drapes, carpets, moving furniture, etc.

iii. Always use a HEPA vacuum and the wet method to clean asbestos dust or debris.

NEVER USE A REGULAR VACUUM OR DRY METHOD.

iv. Avoid any activity that may inadvertently release asbestos fibers into the air such as removing contaminated or potentially contaminated ventilation filters, drying and/or shaking the filters, or removing suspended ceiling tiles below ACM without taking the proper precautions and using the proper personal protective equipment.

4.5 PERSONAL AND AREA AIR MONITORING

A requirement of 40 CFR Part 763.91 is that the LEA ascertain, through monitoring or historical data, the airborne concentration of asbestos fibers during all maintenance and repair activities involving ACBM or assumed ACBM. Coverage of EPA's worker protection rule under 40 CFR Part 763.121 is directed to maintenance staff at schools who perform O&M activities.

OSHA has established and EPA has adopted a Permissible Exposure Limit (PEL) of 0.1 f/cc over an 8 hour time weighted average (TWA) for asbestos exposure. As previously stated, once this level is met or exceeded, a number of required work practices must be implemented, including air monitoring, regulated work areas, engineering and work practice controls, respiratory protection, protective clothing, hygiene facilities and practices, training, medical surveillance and record keeping.

As a means for compliance to those regulations, 8 hour TWA air sampling shall be conducted during any small-scale, short duration maintenance activities involving ACM. It is recommended that air monitoring be performed as follows:

i. Personal samples should be collected at the breathing zone of employee(s) performing a particular asbestos related activity.

ii. It is also recommended that area samples be collected in the vicinity of the maintenance activity to determine the expected level of air contamination in the surrounding areas as a result of the activity.

All air monitoring will be done in accordance with OSHA (29 CFR 1910.1001 and 1926.1101) and EPA's 40 CFR Part 763.121. Sample collection and analysis shall be conducted according to NIOSH methodology. The samples will be taken to determine the 8 hour time weighted average concentrations and ceiling concentrations of asbestos fibers.

Results of all analysis will be posted in the buildings maintenance office and in the office of the LEA's asbestos coordinator. The air analysis report shall be included in the building's management plan as part of the permanent record.

In addition to the above, it should be noted that in response to a U.S. Court of Appeals order, OSHA issued a short term permissible exposure limit designed to protect workers from "bursts" of exposure to asbestos. The limit, referred to as the Excursion Limit (EL), was announced on September 14, 1988 (53 FR 35610) and went into effect on October 14, 1988. This limit amended OSHA's asbestos regulations for general industry and construction industry. The EL limits the exposure of unprotected workers to one fiber per cubic centimeter (f/cc) averaged over a period of 30 minutes. It is advisable that a copy of this ruling be obtained and added to the permanent record.

4.6 CLEANING PROCEDURES

Cleaning procedures described herein describe semiannual cleaning required under AHERA in any area where damaged ACM and/or asbestos containing debris has been identified. All cleaning must conform with requirements set forth in NYS Industrial Code Rule 56.

No initial cleaning records were identified by the AHERA inspector during the review of the original management plan. Initial cleaning requirements under 40 CFR Part 763.91(c) must be met and the appropriate records kept with the management plan.

A. SURFACING MATERIALS

ACM that has been sprayed or troweled onto ceilings and walls are often the main source of airborne asbestos fibers in a building. Areas covered by surfacing ACM tend to be large and, if the material is friable, fibers are gradually released as it ages. Spray any debris found near surfacing ACM with amended water and place the debris in 6 mil polyethylene bags using a wet cloth and pan. Rinse the pan into the bag. Report the presence of debris immediately to the LEA. HEPA vacuum all carpets; no normal vacuums are allowed. Dispose of all debris, filters, mop heads, and cloths in 6 mil polyethylene bags according to EPA regulations for disposal of asbestos waste.

B. THERMAL SYSTEM INSULATION

Cleaning procedures shall be performed in an expedient manner and thereafter on a semiannual basis for all areas where damaged thermal ACM has been located within the building. Once this damage has been abated, the asbestos coordinator shall ensure that the material remains intact. If further deterioration or delamination exists, the findings can be documented during the periodic surveillance and the appropriate response actions shall then be implemented.

C. MISCELLANEOUS MATERIALS

Miscellaneous ACM such as floor tiles, transite board and asbestos containing cement are non-friable forms of asbestos. The potential for fiber release episodes are therefore relatively low.

Because of their low friability, a cleaning program is not suggested for these materials unless they have been damaged. For all other miscellaneous materials the cleaning procedures of surfacing materials should be followed.

4.7 OPERATIONS, MAINTENANCE AND REPAIR PROCEDURES

The AHERA regulation defines those activities which LEA employees are allowed to conduct as "small scale, short duration." The definition is ambiguous but can be interpreted as: a) removal of small quantities of ACBM only if required in the performance of other maintenance and not intended as asbestos abatement; b) removal of thermal insulation in amounts not greater than that which can be contained in a single glove bag; and c) minor patching and repair to surfacing or thermal insulation which does not include removal. New York State Industrial Code Rule 56 clearly defines asbestos related activities, how they to be performed, and the worker qualifications required to perform them. The requirements under this regulation represent the most stringent applicable regulations. Therefore, this regulation shall be adhered to strictly during applicable operations.

A. ROUTINE MAINTENANCE

All maintenance and renovation activities must be approved by the LEA to ensure that ACBM is not inadvertently disturbed. This includes work that is performed by in-house personnel, such as maintenance of mechanical systems, as well as by outside vendors, such as telephone, computer or HVAC contractors. All outside contractors/short-term workers who may come in contact with ACM must check the Management Plan for information regarding the locations of known, suspected & assumed ACBM.

Routine activities which directly impact ACBM are prohibited. These include hanging, taping or tacking objects from ceiling acoustical plaster; storing tools and materials near or against thermal insulation; and sanding or drilling asbestos floor tiles.

Routine activities which may disturb ACBM must be strictly controlled to prevent fiber release. Changing light bulbs in an acoustical plaster ceiling, working on equipment near surfacing or thermal insulation, or replacing floor tiles should be done during off hours by trained staff with appropriate equipment.

All maintenance activities which will disturb ACBM, such as replacing insulation valves or cleaning out insulated flue or boiler equipment, must be performed under the procedures described in federal, state and local regulations. **DRY SWEEPING ACBM DEBRIS IS STRICTLY PROHIBITED.**

B. PERIODIC SURVEILLANCE

At least once every six months after implementing the management plan, the LEA shall conduct periodic surveillance in each functional space that contains ACBM. Inspections of ACBM must be performed as part of the on-going O&M program in order to comply with AHERA. Each person performing periodic surveillance shall:

i. Visually inspect all areas identified in the management as ACBM or assumed ACBM.

ii. Record the date of the surveillance, the inspector's name and any changes in the condition of the ACBM, i.e. water damage, debris, changes in the patterns of use, air erosion or delamination. This information will then be incorporated into AHERA 3 Year Re-Inspection Form, which is located in Appendix 4.

iii. Maintenance personnel should inform the asbestos coordinator when debris has been cleaned up. The cleaning procedures shall be conducted according to section 7.6 of this report and all other applicable regulations.

The maintenance staff should make routine visual inspections of all surfacing materials, thermal insulation and miscellaneous materials. If the inspections reveal a change in the condition of the ACBM the staff shall report their findings to the LEA. The following techniques shall be used:

1. Periodic Surveillance for Surfacing Materials:

- All material is free from any water damage, discoloration or contact damage.
- Inspect vents for signs of air erosion.
- Check horizontal surfaces for visible debris.

2. Periodic Surveillance for Thermal System Materials:

- All wrapping, lagging and protective jackets are intact.
- All material is free from punctures, rips, tears, gashes, gouges and/or water damage. Seams and exposed ends of TSI sections are particularly susceptible to physical damage and should be referred to within the surveillance report.
- Any debris from damaged TSI must be picked up immediately following procedures identified in section 7.6 of this report and all applicable regulations.

3. Periodic Surveillance for Miscellaneous Materials:

- All material is free from contact damage, discoloration or water damage.
- Check horizontal surfaces for visible debris.

Once every three years, or until all of the ACBM is removed, an AHERA accredited inspector must re-inspect the school for the presence of ACBM.

The periodic surveillance and re-inspection shall follow the schedule outlined below:

1st	_	January 2023	2nd	_	July 2023
3rd	_	January 2024	4th	_	July 2024
5th	_	January 2025	Re-inspection	_	July 2025

C. EMERGENCY EVENTS

Minor Fiber Release Episode

The EPA defines a minor fiber release episode as visible emissions or debris from disturbed or damaged ACM which dislodges less than three square feet of surfacing ACM or three linear feet of thermal insulation. When a minor fiber release episode occurs, the asbestos coordinator shall direct work as follows:

1. Restrict access and isolate area during the cleaning process.

2. Apply amended water to the debris, mist air in the area and remove and dispose of the ACM according to federal, state and local regulations.

3. Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos fibers.

4. Remove, repair, encapsulate or enclose the ACM fiber release source as per federal, state and local regulations.

5. Dispose of all asbestos waste according to EPA and other applicable regulations.

6. Document the fiber release episode as part of the management plan.

Major Fiber Release Episode

The EPA defines a major fiber release episode as visible emissions or debris from disturbed or damaged ACM which dislodges greater than three square feet of surfacing ACM or three linear feet of thermal ACM. When a major fiber release episode occurs, the asbestos coordinator shall:

1. Restrict and isolate the affected areas and post warning signs.

2. Use trained and protected workers to lock out HVAC systems to the area.

3. Notify the appropriate regulatory agency as required under NESHAPS.

4. Execute appropriate response actions with accredited abatement designers and contractors.

5. Document the fiber release episode as part of the management plan.

D. REPAIR PROCEDURES

Repair Procedures for Surfacing ACM

All personnel who disturb ACBM must be provided with the proper protective equipment. This shall include, but is not limited to, disposable protective overalls, HEPA vacuums, respirators, high quality duct tape, 6 mil fire retardant polyethylene sheeting, glovebags, spray adhesive, "DANGER ASBESTOS" signs, surfactants, encapsulants, asbestos repair materials, and other appropriate tools.

To repair damaged surfacing materials, follow these procedures:

1. Repair work must be performed by qualified, trained individuals according to all federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. "Caution hazard" signs shall be posted at all work entrances and along perimeter of the work site. If necessary, rope off the area with barrier tape.

4. All vents, lighting fixtures, desks and equipment in the proximity of the work area shall be covered with 6 mil fire retardant polyethylene sheeting.

5. Lock out all ventilation heating and cooling systems to avoid fiber release to areas of the building which are unaffected.

6. Mist air at the location where the repair will be performed.

7. Pick up and dispose of any debris found on surfaces.

8. Wet wipe and HEPA vacuum all horizontal and vertical surfaces potentially contaminated with asbestos fibers. Take down two layers of 6 mil polyethylene sheeting on horizontal and vertical surfaces in the area.

9. After all affected surfaces are free from asbestos debris, lay down two (2) layers of 6 mil fire retardant polyethylene sheeting on horizontal and vertical surfaces in the area.

10. Gently mist the damaged material with amended water and carefully remove loose pieces of ACM.

11. If necessary, fill the damaged areas with a non-asbestos containing plaster or other patch material that will adhere to both the substrate and the adjoining ACM.

12. Encapsulate using a low pressure sprayer.

13. When the repair is complete, remove polyethylene sheeting and dispose of as asbestos contaminated waste.

14. Re-clean the area using wet wiping and HEPA vacuuming techniques.

15. Dispose of cloths, respirator filter cartridges, coveralls, etc. as asbestos contaminated waste.

16. Record activities as part of the management plan and repeat periodic surveillance and cleaning as part of the on going O&M program.

Patch and Repair Techniques for Thermal System Insulation

The following procedures shall be executed:

1. Repair work shall be performed by individuals qualified and trained according to federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. "Caution hazard" signs shall be posted at all work entrances and along perimeter of the work site. If necessary, rope off the area with barrier tape.

4. All vents, lighting fixtures, desks and equipment in the proximity of the work area shall be covered with 6 mil fire retardant polyethylene sheeting.

5. Lock out all ventilation heating and cooling systems to avoid fiber release to areas of the building which are unaffected.

6. Wet wipe and HEPA vacuum all surfaces in the area potentially contaminated with asbestos fibers.

7. Horizontal and vertical surfaces in the vicinity shall be covered with two layers of 6 mil fire retardant polyethylene sheeting.

8. Gently mist the damaged area with amended water.

9. Remove all loose and damaged debris.

10. HEPA vacuum the substrate and surface area.

11. Repair surfaces with an appropriate patching material.

12. Encapsulate the repaired area with an approved encapsulant.

13. Apply fiberglass cloth to wet encapsulant by wrapping around the surface, covering twice with overlapping seams. Smooth out all areas of cloth.

14. Re-encapsulate fiberglass cloth. Use thick, even coats.

15. Wet wipe or HEPA vacuum affected areas.

16. Double bag and dispose of asbestos waste and all debris contaminated plastic, cloths, respirator filter cartridges and disposable clothing.

17. Record all abatement/patch and repair activities as part of the management plan.

E. MINOR THERMAL INSULATION REMOVAL BY GLOVEBAG METHODS

The glovebag method is for removal of damaged insulation on pipes and pipe fittings. A minimum of two people is required to perform a glovebag removal. Repair work shall be performed by qualified individuals, trained according to all federal, state and local regulations. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

1. This method shall be optional only in areas not scheduled for gross removal operations.

2. Glovebags may only be used on piping and after approval from the asbestos coordinator.

3. The workers shall be required to protect equipment by cleaning and wrapping it with polyethylene sheeting, tape and/or adhesive.

4. Workers shall clean and protect as necessary all floors and walls within the work area with 6 mil fire retardant polyethylene sheeting, tape and/or adhesives. As a minimum, extend polyethylene one foot horizontally in all directions for each foot of vertical height from the floor to the material.

5. If fiber levels found on personal samples during glovebag removal exceed 0.01 f/cc and methods to reduce the levels prove futile, the workers shall remove the insulation according to more stringent requirements such as NYS Industrial Code Rule 56 and other applicable guidelines.

6. Using approved glovebags in strict accordance with applicable regulations and the manufacturer's instructions, workers in full protective body clothing and appropriate respirators shall begin removal of pipe insulation as per the following minimum procedures. In case of conflict the more stringent provisions of the applicable regulations shall apply.

7. Cut the sides of the glovebag to fit the size of the pipe to be worked on and insert the needed tools into the attached pocket.

8. Seal the glovebag by folding the open edges, then staple and tape. Provide any additional precautions necessary to support the weight of the debris.

9. Tightly seal the edges of the glovebag around the working area with tape. Slice open the side port to allow entry of the wetting tube and HEPA vacuum hose. Insert the nozzle from the portable sprayer. Seal around with tape and thoroughly wet the area to be removed. Insert the vacuum hose and seal accordingly.

10. Before removal work procedures the glovebag must pass a smoke test as follows:

    i. Aspirate the contents of a smoke tube through the water port access of the bag.
    ii. After twist sealing the access port the bag shall be squeezed gently and checked for any leakage points so they can be taped air tight.

iii. Replace the spray nozzle in the bag and seal with tape.

11. Upon approval of the glovebag attachment, insert arms into the armholes and gloves and wet the material to be removed. Proceed to remove the elbow, valve fitting or pipe. At locations where insulation rests directly on pipe hangers or supports, the worker shall re-support the pipe by shimming with wood blocks or other suitable materials. Continue wetting the material as required. Once all insulation materials have been removed, thoroughly wet the pipe and remaining insulation and wash down the inside of the glovebag.

12. Scrub or brush any visible, remaining insulation material from the pipe or fitting. Rinse and wet pipe again. Seal the exposed insulation edges with the proper encapsulant. When the job is complete, remove the spray nozzle and turn on the HEPA vacuum to remove air from the bag.

13. When the air is removed from the bag, squeeze the bag tightly as close to the top as possible. Twist and tape to keep the asbestos material safely at the bottom of the bag. Turn off the HEPA vacuum. Remove the hose from the side port and seal the side port with tape.

14. Place a 6 mil plastic bag around the glovebag. Cut and remove the glovebag from the pipe. Twist and seal. Place it into another plastic bag and seal. Move bags to holding area or the disposal storage area.

15. Mist surface of protective polyethylene and carefully fold inward. Proceed to HEPA vacuum the work area for any residual materials. Reseal the exposed edges and piping with the proper encapsulant if needed.

16. The testing shall be in accordance to AHERA and other federal, state and local regulations.

17. Reestablish objects moved to temporary locations in the course of work to their proper positions.

F. REPAIR OF NONFRIABLE MISCELLANEOUS ASBESTOS CONTAINING MATERIALS

If a situation such as a damaged floor tile exists, the best possible response action is replacement. If this cannot be done, the following is recommended:

1. Repair work must be performed by qualified individuals, trained according to all federal, state and local regulations.

2. Personal protective equipment and respiratory protection must be worn as per all applicable regulations.

3. Post hazard signs and restrict access to the area.

4. Prohibit access of unauthorized personnel.

5. Clean up debris from surfaces via wet wipe/HEPA vacuum methods. No drilling, cutting with power tools or sanding is permitted.

6. Cut all floor tiles with a utility knife.

7. Fill all holes and cracks with an equivalent non-ACM and/or plaster. Apply a thick coating of bridging encapsulant at full strength. This form of encapsulant differs from a penetrating encapsulant in that it forms a surface layer of "skin" over non-friable, impenetrable forms of asbestos. Allow to dry and apply a second coat.

8. Record activities as part of the management plan and repeat periodic cleaning and surveillance as part of the on-going O&M program.

4.8 WASTE DISPOSAL

All ACM waste shall be double bagged in 6 mil polyethylene plastic bags. These bags shall be preprinted as per OSHA and Federal DOT requirements to show they contain ACM. Asbestos waste shall be kept in a secured and controlled location such as a routine and maintenance area of the facility. Filled bags of waste are carried to this area and placed in sealable metal or fiber 55 gallon drums, labeled as per applicable regulations. When the drums are full, they shall be sealed, labeled and transported to a landfill site approved to accept ACM waste by EPA and all other federal, state and local requirements.

The waste containers shall be transported to the landfill site in a covered, lockable vehicle. All transported containers shall be accompanied by a proper chain of custody (manifest) form that details the origin of the material, date and quantities of transport, types of containers and their destinations. If transported by a third party hauler, information on the form is signed at each transfer point and, after final transport to the landfill site, a copy of the form shall be maintained in the management plan.

4.9 WARNING LABELS

Warning labels shall be attached immediately adjacent to any friable and non-friable ACBM located in routine maintenance areas as per 40 CFR Part 763.95. The labels must be of a size, print and color easily visible to persons entering an area containing ACBM. The labels will read:

CAUTION ASBESTOS, HAZARDOUS
DO NOT DISTURB
WITHOUT PROPER TRAINING AND EQUIPMENT

Warning labels and signs must remain in place until the asbestos containing material(s) is/are removed.

4.10 NOTIFICATIONS OF AFFECTED PARTIES

AHERA requires that steps be taken to inform workers and building occupants, or their legal guardians, about inspections, re-inspections, response actions, and post-response action activities, including periodic re-inspection and surveillance activities which are planned or in progress. At a minimum, these notifications must occur on a yearly basis following the initial notification. Notifications of the various parties can be accomplished in two ways:

1. Distributing notices; and
2. Holding awareness and/or informational seminars.

The distribution of notices is an effective means of alerting occupants about the presence of asbestos. Memorandums or letters tailored to specific parties provide excellent documentation along with verification that the notification was furnished. The AHERA Management Plan must be made available for review by the public, including but not limited to parents, teachers and other school personnel and their representatives, without cost or restriction. The school, however, may charge a reasonable fee to make copies.

Awareness and/or information seminars can follow written notification. These serve to expand upon the information given in the written form. They also serve as a question and answer period for anyone with questions regarding asbestos. Copies of notification memos, attendance lists at any awareness seminars, hand-outs provided, and the name of the person or persons providing the seminars should be filed.

4.11 SUGGESTED OPERATIONS AND MAINTENANCE EQUIPMENT

1. Disposable coveralls
2. Rubber or latex gloves
3. Half face, dual cartridge negative pressure respirators with NIOSH and MSHA approved cartridges
4. Safety goggles
5. Surfactant
6. Misting spray bottle
7. Misting spray tank
8. Dust mop/broom
9. Polyethylene sheeting (6 mil)
10. Asbestos disposal bags (6 mil)
11. HEPA vacuum with attachments
12. Duct tape
13. Hand tools
14. Warning signs and labels
15. Scrim cloth and/or foil tape for pipe wrap
16. Encapsulant bridging and penetrating
17. Smoke tube kit
18. Glovebag

4.12 DOCUMENTATION AND RECORD KEEPING

As part of the management plan, the LEA must maintain all records required by AHERA in a central file at the administrators office, which is currently the district office, located at 66 Roaring Brook Road, Chappaqua, NY 10514, as well as in individual buildings as per 40 CFR 763.94. These records shall include documentation of all ACBM locations, conditions, response actions and activities in addition to training, medical records and personnel updates.

A list of items to be included in this file is:

1. All abatement activity and related documents and test results until (1) the entire homogeneous area has been removed and (2) for at least three years after the next re-inspection. This information must be comprehensive and complete.

2. For each response action or preventive maintenance procedure: (a) detailed description of work, (b) methods used, (c) location of action, (d) reasons for selecting action, (e) start and completion dates, (f) names and addresses of all contractors used, their state of accreditation and accreditation numbers, (g) name and location or storage or disposal site for ACBM which was removed, (h) names and signatures of persons collecting air samples, (i) locations where air samples were collected, (j) date of sample collection, (k) name/address of lab analyzing the samples, (l) date of analysis, (m) results of analysis, (n) method of analysis, (o) name/signature of analyst, and (p) statement that the lab meets requirements.

3. Documentation of the LEA's employee training program with: (a) an updated list of personnel involved, (b) date and location of the training, and (c) number of training hours completed.

4. Periodic surveillance results including: (a) the inspector's name, (b) date of the surveillance, (c) findings of the surveillance, and (d) remedial action taken, if any.

5. For each O&M procedure: (a) the person's name who did the O&M, (b) start and c-completion dates, (c) locations of the activity, (d) description of the activity/ preventative measures, and (e) ACBM storage or disposal site.

6. For each fiber release episode under 40 CFR Part 763.91(f): (a) date and location of the episode, (b) method of repair, (c) preventative measure or response action taken, (d) the name of each individual involved and their activity and, if applicable, (e) the storage or disposal site for the ACM removed.

7. For each major asbestos activity performed: (a) name, signature, State of accreditation, and accreditation number of each person performing the activity, (b) locations of the activity, (c) description of the activity/preventative measure, and, if applicable, (d) the storage or disposal site for the ACM removed.

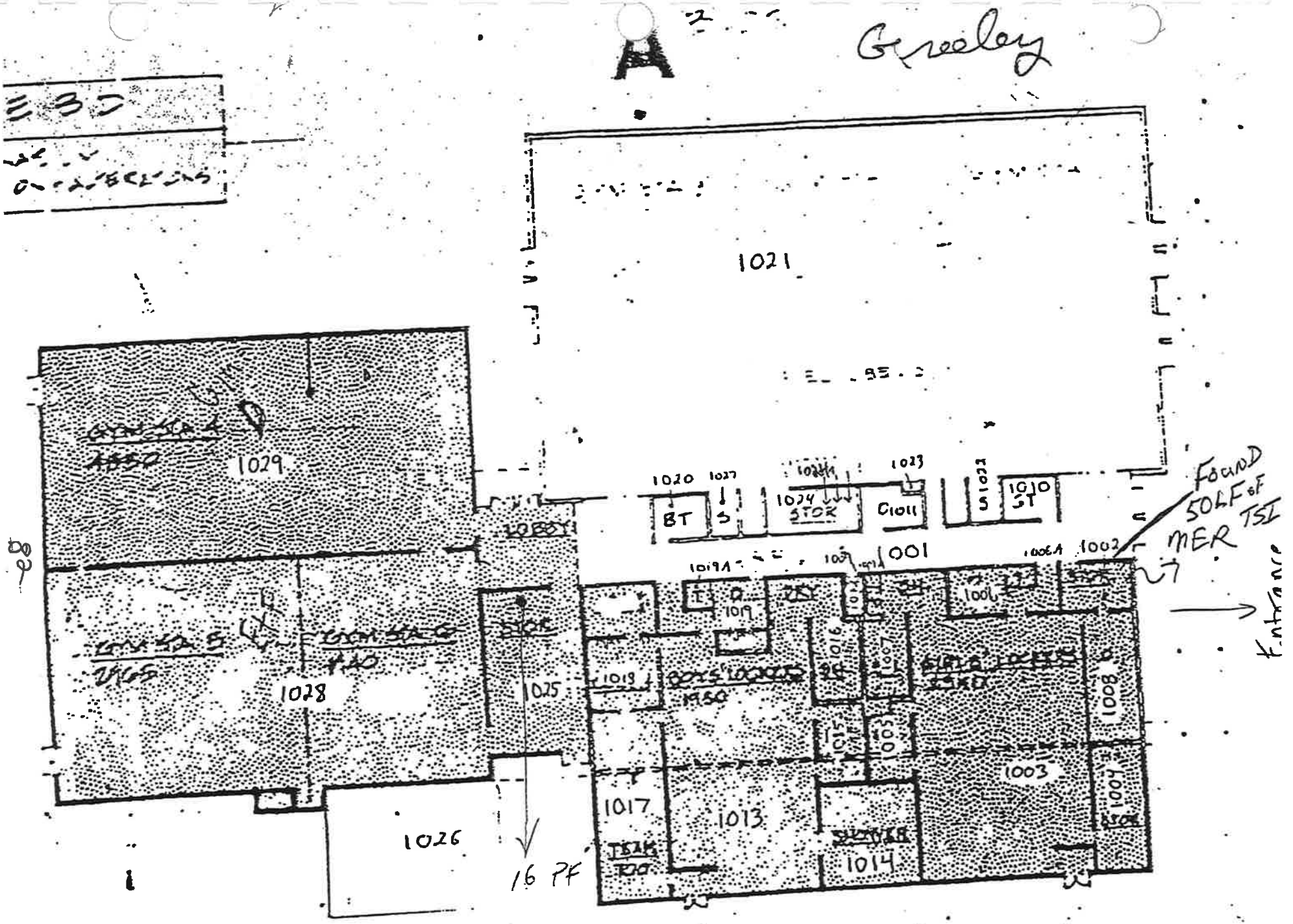
5.0 LEA DESIGNATED PERSON

As stated in the AHERA regulations, each LEA must designate a competent person to be responsible for implementing the Management Plan for each school. For the Chappaqua Central School District, the designated person as of the start of this inspection is:

Joseph Gramando
Buildings and Grounds Office
66 Roaring Brook Road
Chappaqua, NY 10514

APPENDIX 1:

SITE PLANS


A
Greeley
1021
1029
1028
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1027
1024
STOR
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TSI
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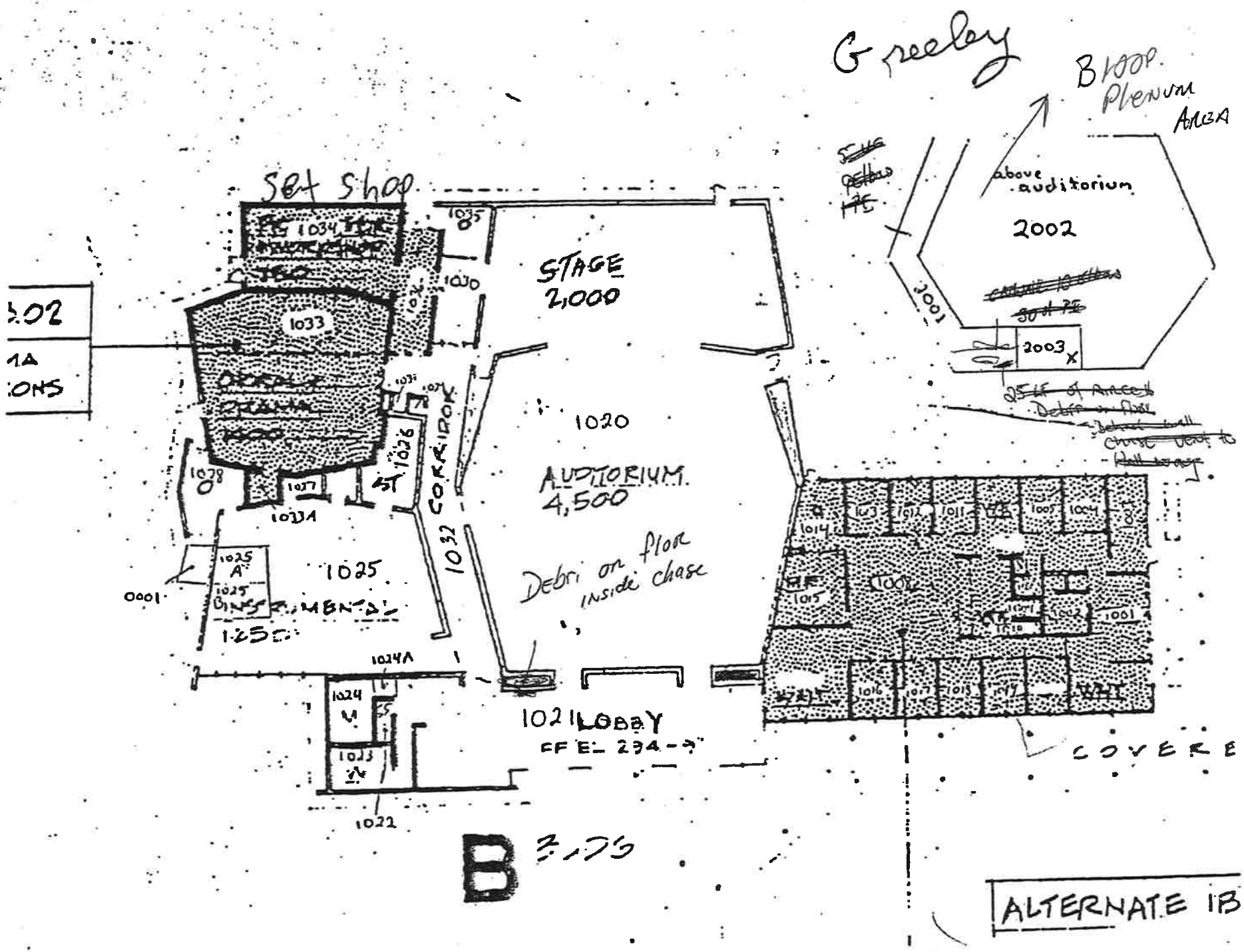
Entrance
16 PF


Greeley
Bloop Plenum Area
above auditorium
2002
2001
2003
Set Shop
1034
1035
1030
1033
STAGE
2,000
1020
AUDITORIUM
4,500
1032 CORRIDOR
1036
1037
1031A
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1025 A
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1025 C
0001
1024A
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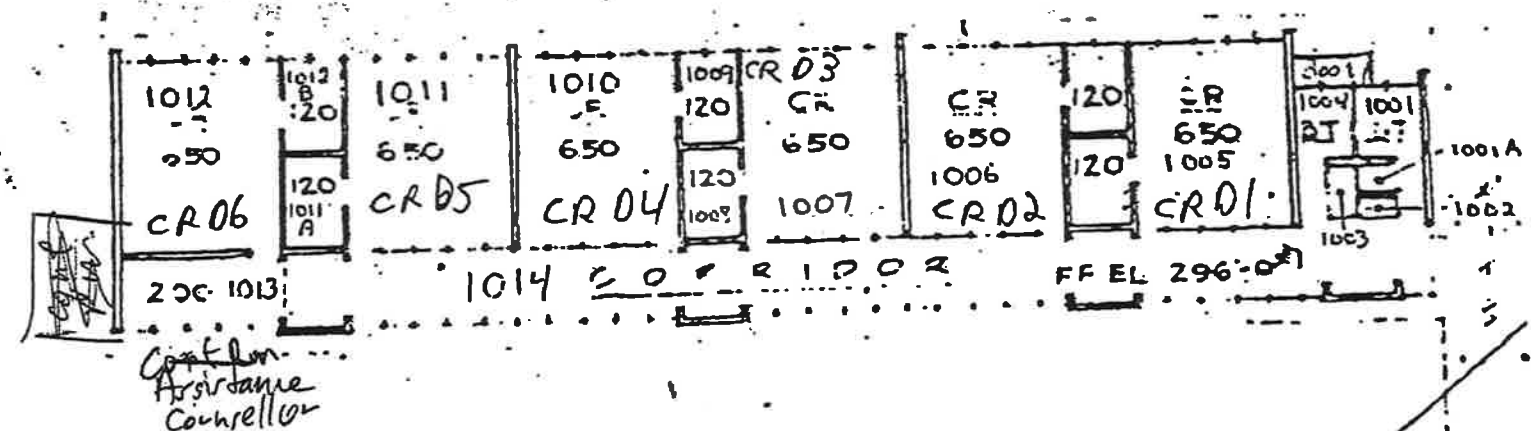
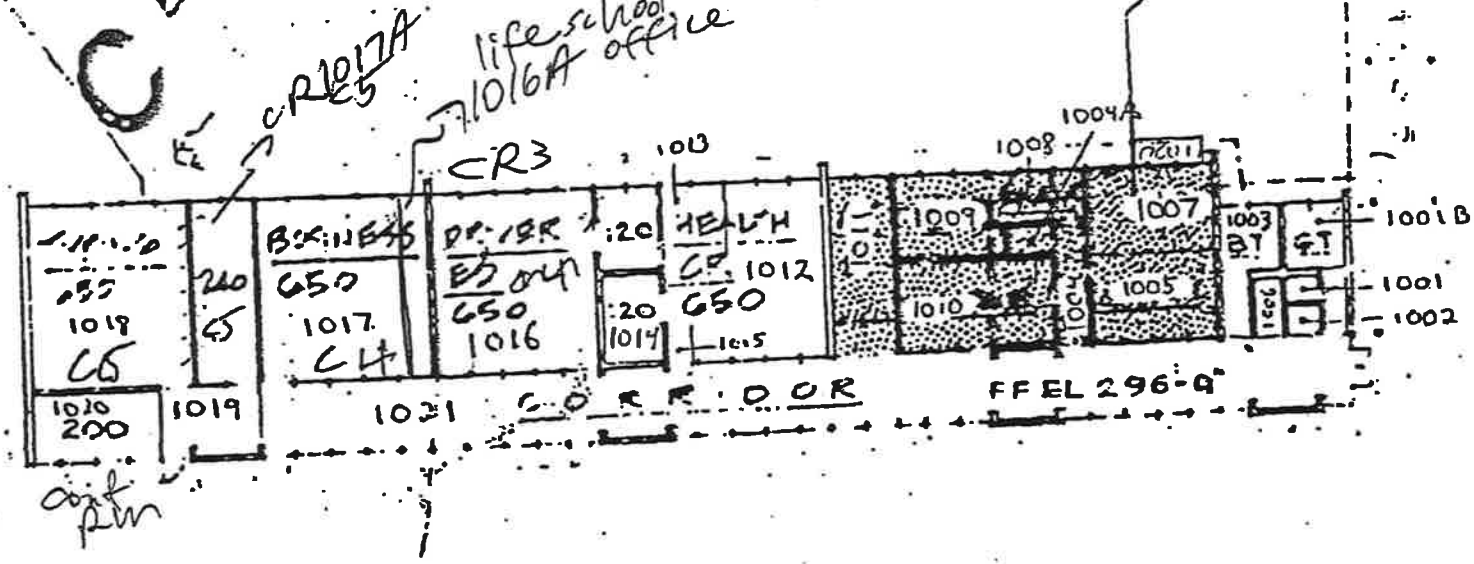
Greeley

D 2-D6



Comfort Assistance Counsellor

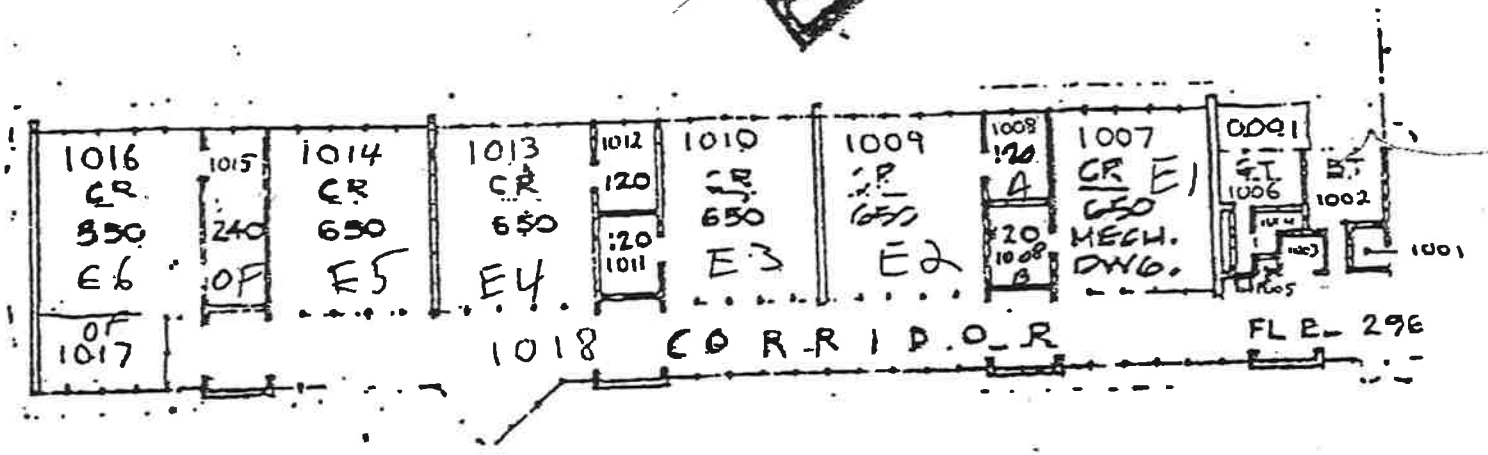
C 2-D6



Comfort Assistance Counsellor

h8

Greeley


1016
CR
350
E6
OF
1017
1015
240
OF
1014
CR
650
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1013
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1010
CR
650
E3
1009
CR
650
E2
1008
120
A
1008
B
1007
CR
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MECH.
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0001
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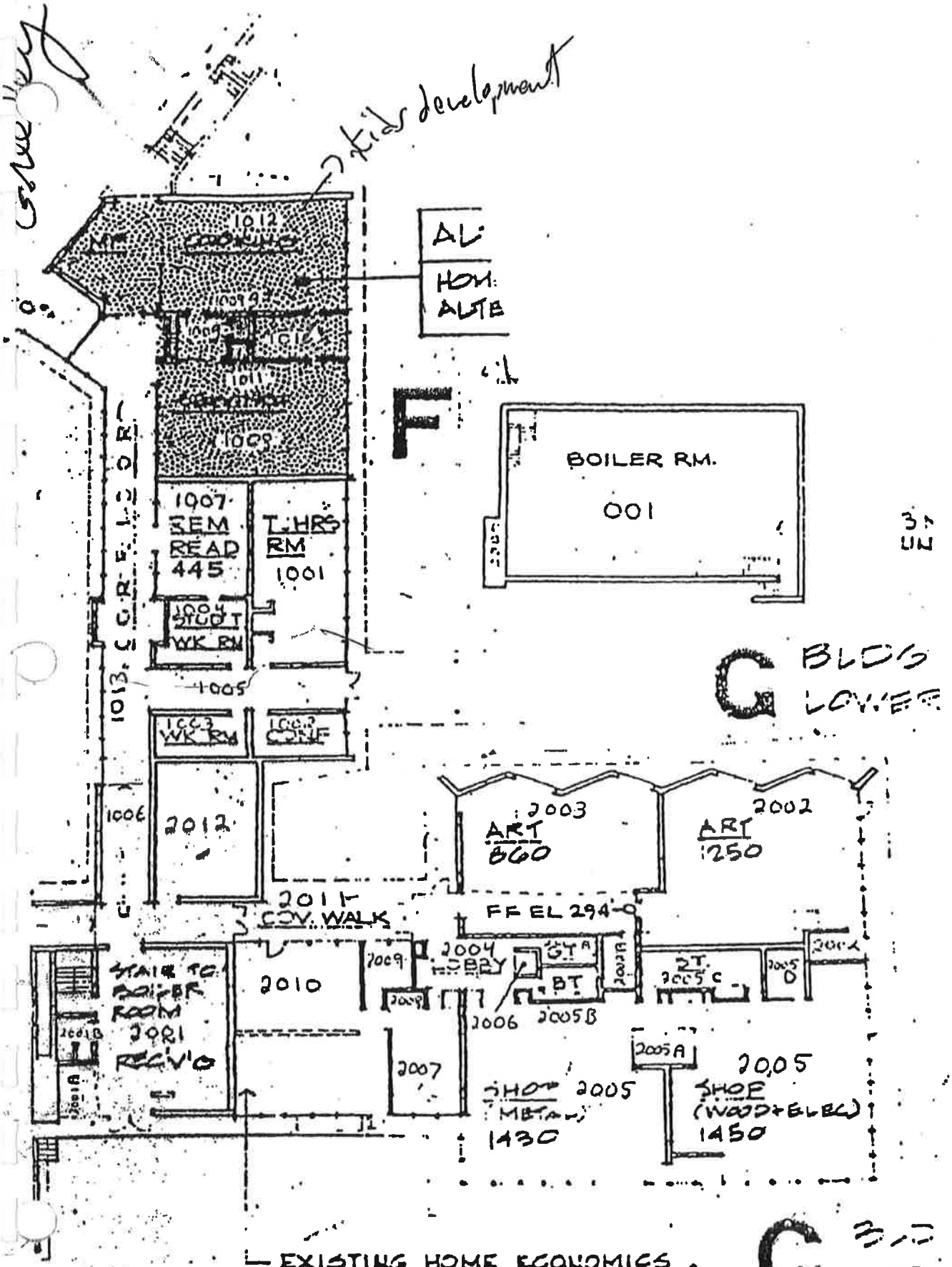
1006
1002
1001
1018 CORRIDOR
FLR 296


1012
1009A
1009
1011
1007
SEM
READ
445
T. HRS
RM
1001
1004
STUDT
WK RM
1005
1013
1003
WK RM
1002
CONF
1006
2012
2011
COV. WALK
2003
ART
860
2002
ART
1250
FF EL 294
2004
BRY
ST A
BT
2002B
2T
2005C
2005D
2002A
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2010
2008
2006
2005B
2005A
2005
SHOE
(WOOD+ELEC)
1450
2007
SHOE
META
1430
STAIR TO
BOILER
ROOM
2001
RECV'D
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AL
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BOILER RM.
001
F
G BLDG
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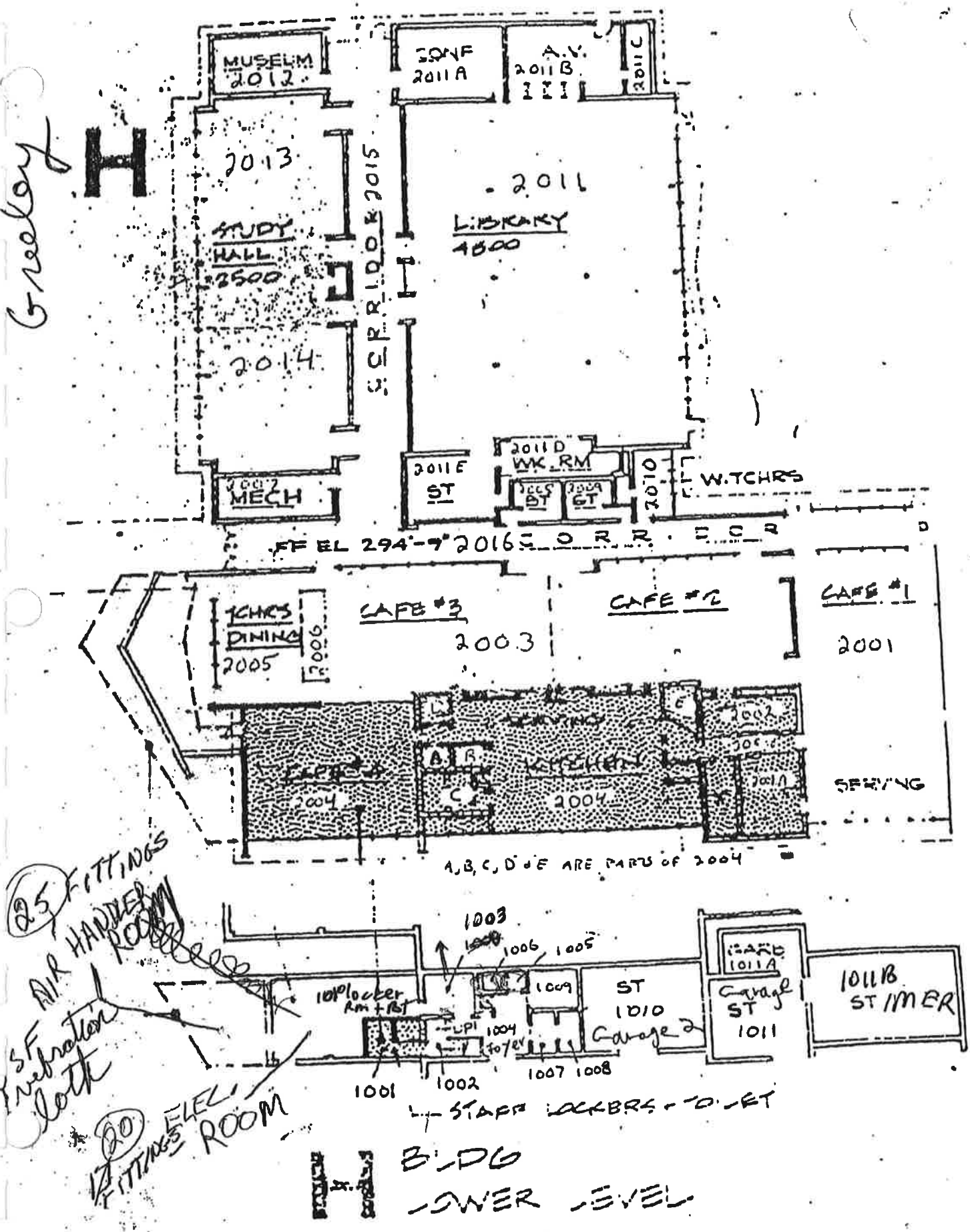
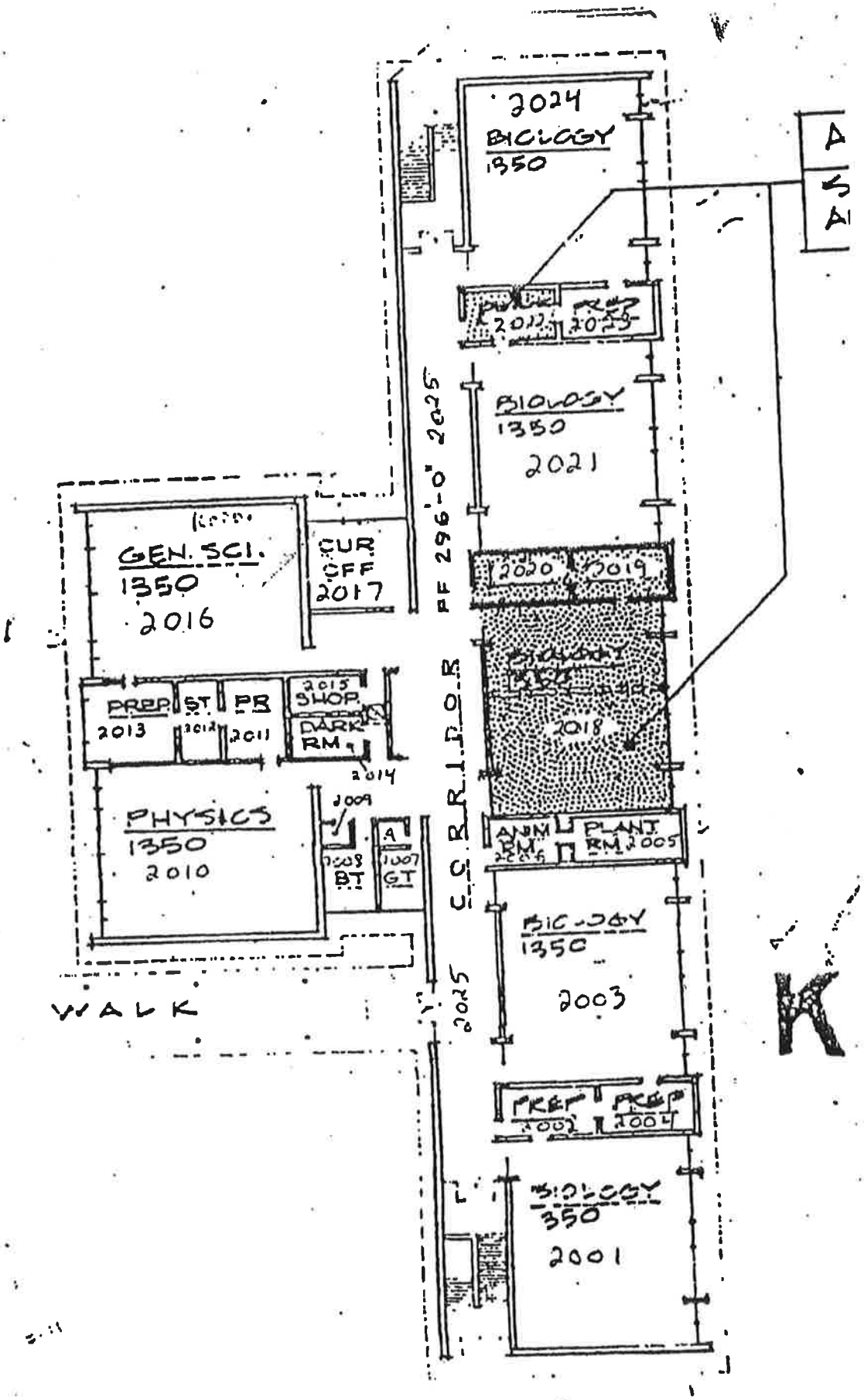
FF
EXISTING HOME ECONOMICS
AREA. REMOVE EQUIPMENT
UNDER 1B.03. (CONVERSION


Grocery
MUSEUM 2012
CONF 2011A
A.V. 2011B III
2011C
2013
STUDY HALL 2500
2014
CORRIDOR 2015
LIBRARY 4800
2011
2011D WK. RM
2011E ST
2007 MECH
2008 ST
2009 ST
2010
W.TCHRS
FF EL 294'-9" 2016 CORR. E.C.R.
TCHRS DINING 2005
2006
CAFE #3
2003
CAFE #2
CAFE #1
2001
2002
SERVING
A B C
2004
KITCHEN
2004
2001A
SERVING
A, B, C, D & E ARE PARTS OF 2004
25 FITTINGS
AIR HANDLER ROOM
AIR VIBRATION ISOLATION
20 FITTINGS
ELEC. ROOM
1003
1006
1005
1009
ST 1010
Garage 2
GARB 1011A
Garage ST 1011
1011B ST/MER
101 Locker Rm + Rt
UP
1004 TOILET
1001
1002
1007
1008
STAFF LOCKERS + TOILET
BLDG
LOWER LEVEL

Geology


2024
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BIOLOGY
1350
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GEN. SCI.
1350
2016
CUR
OFF
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PF 296'-0" 2025
2020
2019
2018
PREP
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SHOP
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1350
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2009
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A
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GT
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ANIM
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PLANT
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2005
BIOLOGY
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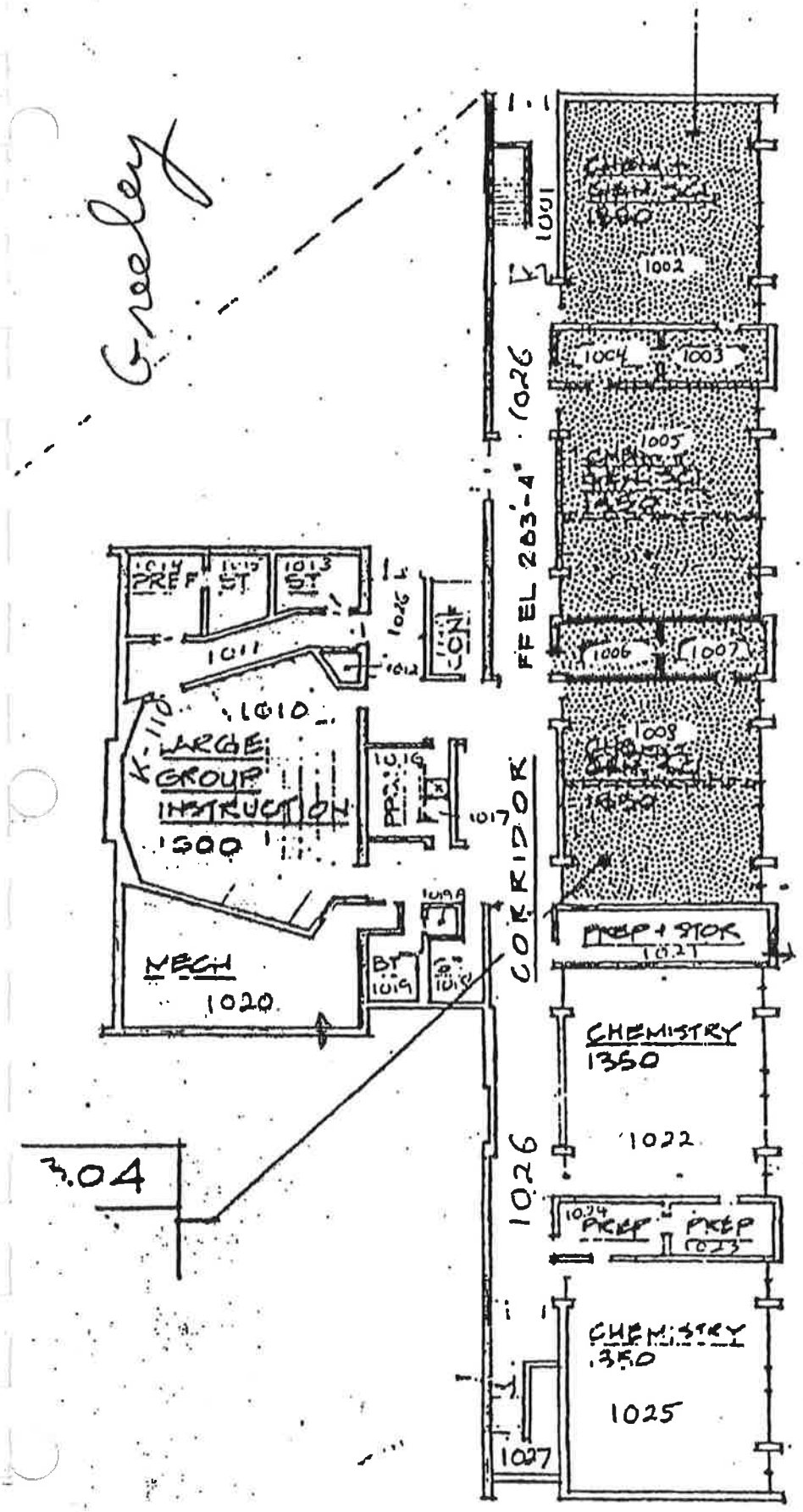
BIOLOGY
350
2001
C O R R I D O R
2025
WALK
K


Greeley
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1002
1004
1003
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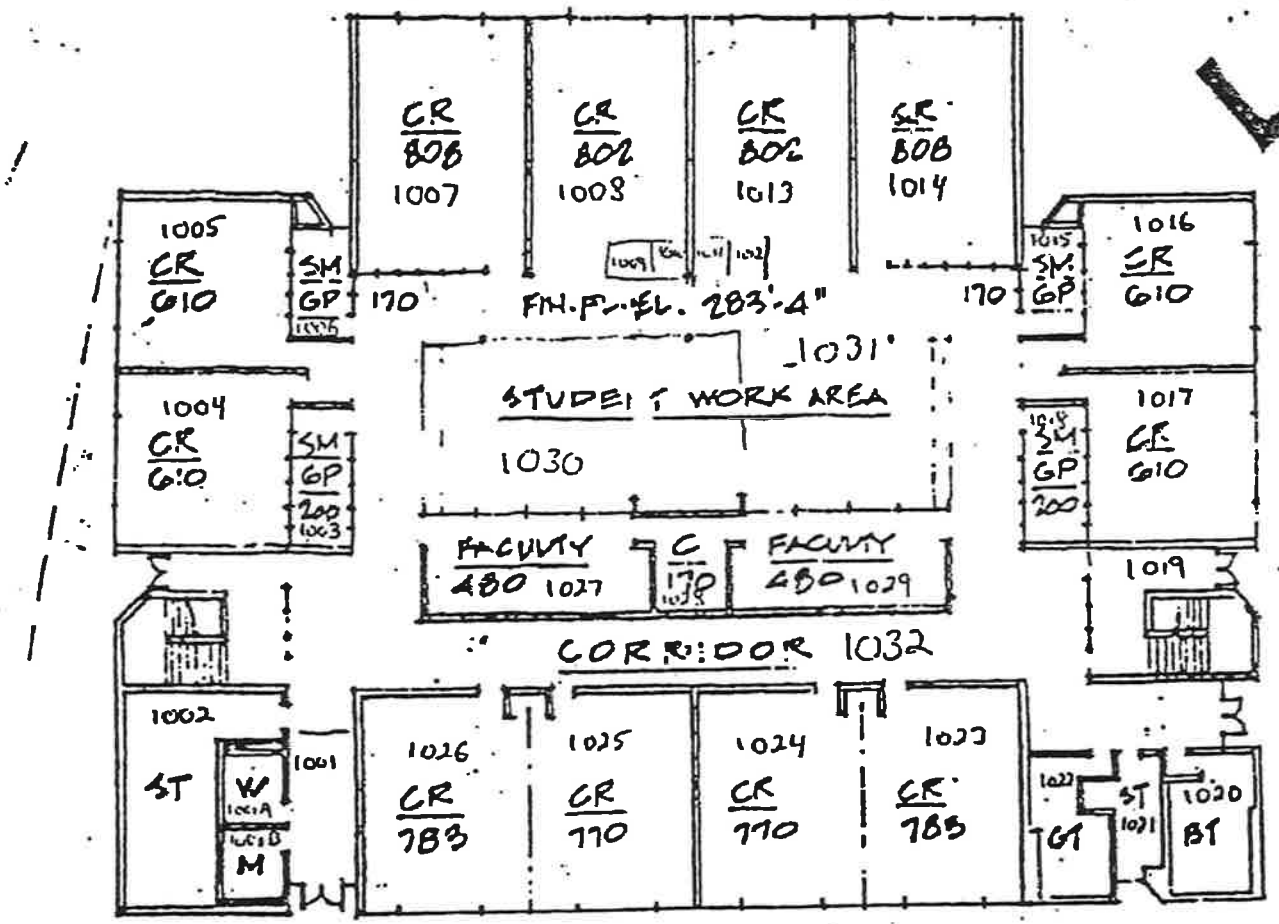
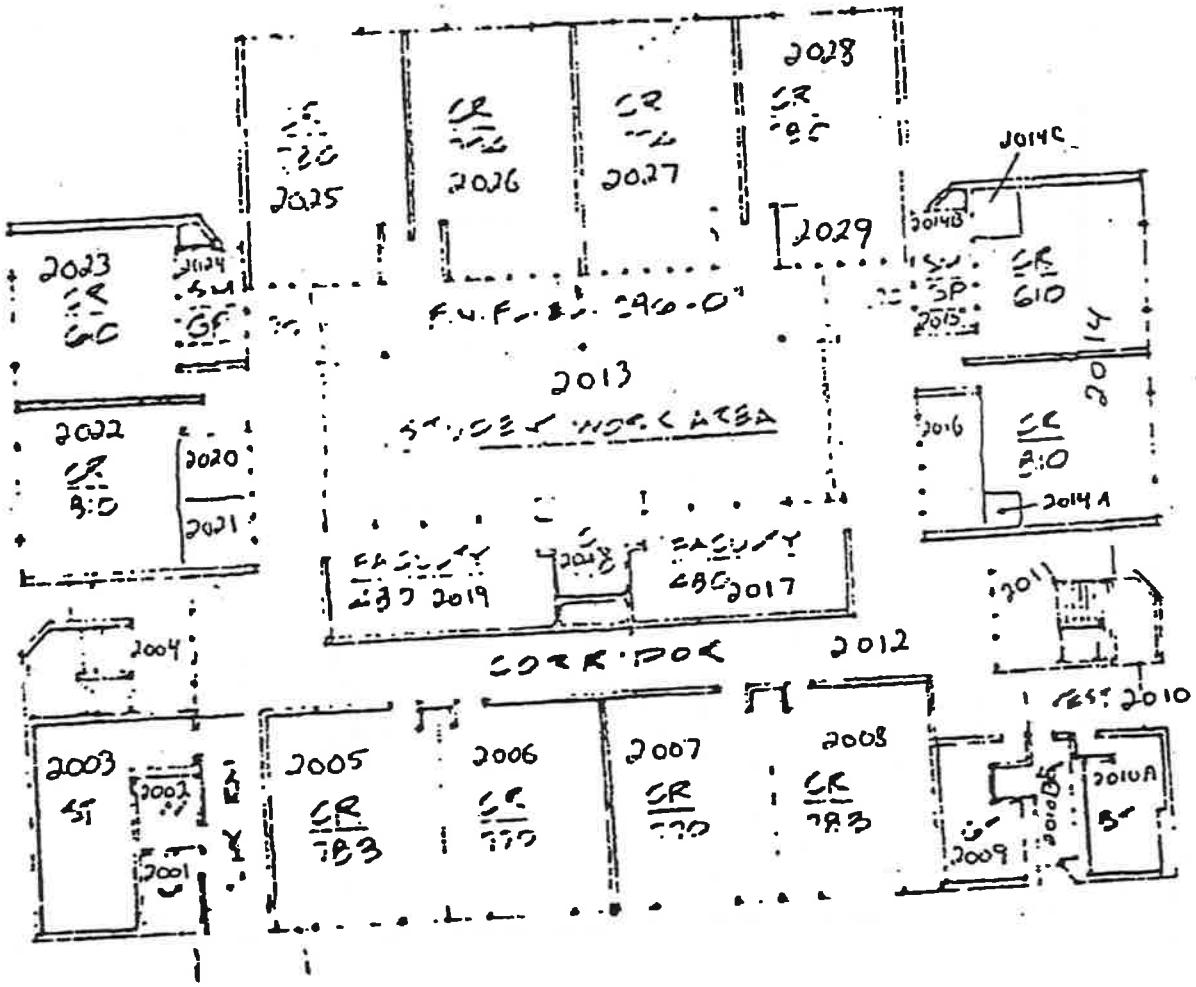
1007
1008
1026
FF EL 203'-4"
1014 PREP
1015 ST
1013 ST
1011
1012
1016
CONF
1010
K-110
LARGE GROUP INSTRUCTION 1300
1018
1017
1019A
MECH 1020
BT 1019
1019
CORRIDOR
PREP + STOR 1027
CHEMISTRY 1350
1022
1024 PREP
PREP 1023
CHEMISTRY 1350
1025
1027
3.04

K BLDG LOWER

Greeley


CR 808 1007
CR 802 1008
CR 802 1013
SR 808 1014
1005 CR 610
SM GP 170
FIN. FL. EL. 283'-4"
170
1016 CR 610
1031'
STUDENT WORK AREA
1030
1004 CR 610
SM GP 200
1017 CR 610
FACULTY 480 1027
C 178
FACULTY 480 1029
1019
CORRIDOR 1032
1002 ST
W
M
1001
1026 CR 783
1025 CR 770
1024 CR 770
1023 CR 783
1022 GT
ST 1021
1020 BT

Greeley


2028
2025
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2027
2029
J014C
2014B
2023
J012A
2022
2020
2021
F.W.F. 2960-0"
2013
SERVICE WORK AREA
2016
2014A
2019
2018
2017
2004
CORRIDOR
2012
2010
2003
2002
2001
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2006
2007
2008
2009
2010A
2010B

APPENDIX 2:

HOMOGENEOUS AREA SHEETS

500 Summit Drive, Suite 450
Valhalla, New York 10595

HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Horace Greeley High School

Inspector(s): Williams Ng-Feng, Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
01	**Pipe Insulation**	**TSI**	**YES**	**YES**
02	**Pipe Fittings**	**TSI**	**YES**	**YES**
03	**Vibration Cloth**	**M**	**YES**	**NO**
04	**9”x9” Floor Tile**	**M**	**YES**	**NO**
05	**12”x12” Floor Tile**	**M**	**YES**	**NO**
06	**Joint Compound – White (Building L)**	**M**	**YES**	**YES**
07	Sheetrock – Gray (Building L)	M	NO	YES
08	Cinderblock Mortar – Gray (Building L)	M	NO	YES
09	Mastic Remnants on 4” Gray Cove Base – Yellow (Building L)	M	NO	NO
10	Mastic to 4” Cove Base – Gray (Building L)	M	NO	NO
11	4” Cove Base (Building L)	M	NO	NO
12	Mastic to White and Red 12”x12” Floor Tiles - Yellow (Building L)	M	NO	NO
13	12”x12” Floor Tile – White (Building L)	M	NO	NO
14	12”x12” Floor Tile – Red (Building L)	M	NO	NO
15	Mastic to Beige 12”x12” Floor Tiles – Yellow (Building L)	M	NO	NO
16	12”x12” Floor Tile – Beige (Building L)	M	NO	NO
17	Mastic to Blue 12”x12” Floor Tiles – Yellow (Building L)	M	NO	NO
18	12”x12” Floor Tile – Blue (Building L)	M	NO	NO
19	Textured Wall Paper – White (Building L)	M	NO	YES
20	2’x2’ Fissure Ceiling Tile – Gray (Building L)	M	NO	YES
21	Canvas Over Fiberglass Pipe Insulation – White (Building L)	TSI	NO	YES
22	Partition Wall Window Sealant – Gray (Building L)	M	NO	NO
23	Mastic to Beige 4” Cove Base – Yellow (Building L)	M	NO	NO
24	4” Cove Base – Beige (Building L)	M	NO	NO
25	Leveling Compound to 12”x12” Terrazzo Pattern Floor Tiles – Gray (Building L)	M	NO	YES
26	Mastic to Red and Beige 12”x12” Terrazzo Pattern Floor Tile – Gray (Building L)	M	NO	NO

500 Summit Drive, Suite 450
Valhalla, New York 10595

HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Horace Greeley High School

Inspector(s): Williams Ng-Feng, Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
27	12”x12” Terrazzo Pattern Floor Tile - Beige (Building L)	M	NO	YES
28	12”x12” Terrazzo Pattern Floor Tile - Red (Building L)	M	NO	YES
30	Interior Brick Mortar – Gray (Building L)	M	NO	YES
31	2’x2’ Textured Ceiling Tile – Gray (Building L)	M	NO	YES
32	Ceramic Wall Tile Backing – White (Building L)	M	NO	YES
33	Ceramic Wall Tile Grout – White (Building L)	M	NO	YES
34	Ceramic Floor Tile Mortar/Grout – Gray (Building L)	M	NO	YES
35	Cinderblock Mortar – Gray (Building K)	M	NO	YES
36	Glue to 1’x1’ Ceiling Tile – Brown (Building K)	M	NO	NO
37	1’x1’ Ceiling Tile – Gray (Building K)	M	NO	YES
38	**Leveling Compound to White 12”x12” Floor Tile – Gray (Building K)**	**M**	**YES**	**YES**
39	Mastic to White 12”x12” Floor Tile - Brown (Building K)	M	NO	NO
40	12”x12” Floor Tile – White (Building K)	M	NO	NO
41	Wall Panel – Brown (Building K)	M	NO	NO
42	Mastic to Beige 12”x12” Terrazzo Pattern Floor Tile – Yellow (Building K)	M	NO	YES
43	12”x12” Terrazzo Pattern Floor Tile – Beige (Building K)	M	NO	YES
44	Mastic to Stair Tread – Yellow (Building K)	M	NO	NO
45	Mastic to Black 4” Cove Base – Yellow (Building K)	M	NO	NO
46	4” Cove Base – Black (Building K)	M	NO	NO
47	Interior Door Frame Caulk – Red (Building K)	M	NO	NO
48	Joint Compound – White (Building H)	M	NO	YES
49	Sheetrock – Gray (Building H)	M	NO	YES
50	Mastic to Beige 4” Cove Base – Tan (Building H)	M	NO	NO
51	4” Cove Base – Beige (Building H)	M	NO	NO
52	Interior Brick Mortar – Gray (Building H)	M	NO	YES
53	Carpet Mastic – Beige (Building H)	M	NO	NO

500 Summit Drive, Suite 450
Valhalla, New York 10595

HOMOGENEOUS AREA SHEET

Client: Chappaqua Central School District **Project Site:** Horace Greeley High School

Inspector(s): Williams Ng-Feng, Dmitri Kirnossenko **Management Planner(s):** Alexander Smolyar **Project #:** 31403475.032

HA #	Homogenous Area Description	Material Type	ACM	Friable
54	Leveling Compound Under Floor Tile – Gray (Building H)	M	NO	YES
55	Mastic to 12”x12” Terrazzo Pattern Floor Tiles – Gray (Building H)	M	NO	NO
56	12”x12” Terrazzo Pattern Floor Tile - Green (Building H)	M	NO	YES
57	12”x12” Terrazzo Pattern Floor Tile - Red (Building H)	M	NO	YES
58	12”x12” Terrazzo Pattern Floor Tile - Beige (Building H)	M	NO	YES
59	1’x1’ Spline Ceiling Tile – Gray (Building H)	M	NO	YES
60	2’x2’ Fissure Ceiling Tile – Gray (Building H)	M	NO	YES
61	Joint Compound – White (Building G)	M	NO	YES
62	Sheetrock – Gray (Building G)	M	NO	YES
63	Cinderblock Mortar – Gray (Building G)	M	NO	YES
64	**Joint Compound to Pipe Chase – Beige (Building G)**	**M**	**YES**	**YES**
65	2’x2’ Fissure Ceiling Tile – Gray (Building G)	M	NO	YES
66	Mastic to Black 4” Cove Base – Yellow (Building G)	M	NO	NO
67	4” Cove Base – Black (Building G)	M	NO	NO
68	Mastic to Beige 12”x12” Terrazzo Pattern Floor Tiles – Black (Building G)	M	NO	NO
69	12”x12” Terrazzo Pattern Floor Tile - Beige (Building G)	M	NO	YES
70	2’x4’ Fissure Ceiling Tile – Gray (Building G)	M	NO	YES
71	Mastic to Gray 12”x12” Floor Tiles - Black (Building G)	M	NO	NO
72	12”x12” Floor Tile – Gray (Building G)	M	NO	NO
73	Asphalt to Path – Black (Building G)	M	NO	NO
74	Interior Brick Mortar – Gray (Building B)	M	NO	YES
75	2’x4’ Fissure Ceiling Tile – Gray	M	NO	YES
76	Cinder Block Mortar - Gray	M	NO	YES

TSI = Thermal System Insulation S = Surfacing M = Miscellaneous

APPENDIX 3:

HAZARDOUS ASSESSMENT FORM

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT AND MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
HORACE GREELEY HIGH SCHOOL
70 ROARING BROOK ROAD, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
A1002	Mechanical Room	01	Pipe Insulation	75 LF	7	-	-	75 LF	Arcell Pipe Insulation Observed in Plenum Leading to Lobby
		02	Pipe Fittings	10 LF	7	-	-	5 LF	
A1028	Fitness Center	02	Pipe Fittings	8 LF	7	-	-	8 LF	
		03	Vibration Cloth	60 SF	X	-	-	5 SF	
A1029	D Gym	01	Pipe Insulation	20 LF	7	-	-	20 LF	
B100P	Plenum Above Auditorium	02	Pipe Fittings	100 LF	1	25 LF		75 LF	
B1022	Slop Sink	02	Pipe Fittings	6 LF	7	-	-	6 LF	
B1023A	Women's Room	02	Pipe Fittings	2 LF	7	-	-	2 LF	Assumed Present In Wall
B1024A	Men's Room	02	Pipe Fittings	2 LF	7	-	-	2 LF	Assumed Present In Wall
B1033A	Drama Office	04	9"x9" Floor Tile	25 SF	X	-	-	25 SF	Inaccessible
B1034	Set Shop	02	Pipe Fittings	25 LF	7	-	-	25 LF	
C1014	Life School Office	04	9"x9" Floor Tile	200 SF	X	-	-	200 SF	12"x12" Floor Tile Observed (Grey)
C1016	Room C4	04	9"x9" Floor Tile	650 SF	X	-	-	650 SF	12"x12" Floor Tile Observed (Beige)
E1000P	Sub-Floor Pipe Chase	01	Pipe Insulation	100 LF	7	-	-	100 LF	No Access
F1000P	Sub-Floor Pipe Chase	01	Pipe Insulation	100 LF	7	-	-	100 LF	No Access
F1009	Office	05	12"x12" Floor Tile	-	-	-	-	-	White FT 14"x14" (Abated)
F1010	Kitchen	05	12"x12" Floor Tile	-	-	-	-	-	Carpet on Concrete (Abated)
G1000P	Sub-Floor Pipe Chase	01	Pipe Insulation	285 LF	7	-	-	285 LF	No Access
G2001A	Supply Room	05	12"x12" Floor Tile	100 SF	X	-	-	100 SF	Under Carpet

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT AND MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
HORACE GREELEY HIGH SCHOOL
70 ROARING BROOK ROAD, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
G2001B	Bathroom	05	12"x12" Floor Tile	100 SF	X	-	-	100 SF	12"x12" Black FT, Self-Adhesive above VAT
G2002	Digital Art	02	Pipe Fittings	8 LF	7	-	-	8 LF	Above Ceiling Tile
G---	Electrical Conduit Room	02	Pipe Fittings	10 LF	7	-	-	10 LF	Above Ceiling Tile
G2005	Wood Shop Storage	02	Pipe Fittings	10 LF	7	-	-	10 LF	Above Ceiling Tile
G2012	Photo Lab	02	Pipe Fittings	10 LF	7	-	-	10 LF	
H1000P	Sub-Floor Pipe Chase	01	Pipe Insulation	300 LF	7	-	-	300 LF	No Access
H1001	Bathroom Locker Area (Kitchen Staff)	02	Pipe Fittings	6 LF	7	-	-	6 LF	
		04	9"x9" Floor Tile	75 SF	X	-	-	75 SF	
H1004	Foyer	02	Pipe Fitting	40 LF	7	-	-	40 LF	
		01	Pipe Insulation		7	-	-		
H1005	Electrical Vault	02	Pipe Fittings	6 LF	7	-	-	6 LF	
		01	Pipe Insulation		7	-	-		
H1006	Electrical Closet	02	Pipe Fittings	40 LF	7	-	-	40 LF	
		01	Pipe Insulation		7	-	-		
H1008	Electrical Closet	02	Pipe Fittings	5 LF	7	-	-	5 LF	
H1010	Garage Storage Room	01	Pipe Insulation	175 LF	7	25 LF	-	175 LF	
		02	Pipe Fittings		7	-	-		
H1011	Garage 1	02	Pipe Fittings	9 LF	7	-	-	9 LF	
H1011A	Garage 1 Storage Room	02	Pipe Fittings	10 LF	7	-	-	10 LF	
H1011B	Garage 1 Mechanical Room	02	Pipe Fittings	40 LF	7	-	-	40 LF	

HAZARD ASSESSMENT FORM
2022 AHERA 3 YEAR RE-INSPECTION REPORT AND MANAGEMENT PLAN

CHAPPAQUA CENTRAL SCHOOL DISTRICT
HORACE GREELEY HIGH SCHOOL
70 ROARING BROOK ROAD, CHAPPAQUA, NY 10514

Space ID	Description / Common Name	HA	HA Description	Quantity	Assessment	Response Action			Comment
						Remove	Repair	O&M	
K000U	Sub-Floor Pipe Chase	01	Pipe Insulation	1300 LF	7	-	-	1300 LF	No Access
K1000P	Hallway Plenum	02	Pipe Fittings	1300 LF	7	-	-	1300 LF	Above Drop Ceiling
K1020	Mechanical Room	02	Pipe Fittings	30 LF	7	-	-	30 LF	New Fiberglass Insulation
LBSMT	Storage Room	02	Pipe Fittings	5 LF	7	-	-	5 LF	
LBSMT	Garage	02		8 LF	7	-	-	8 LF	
LBSMT	Mechanical Room	02	Pipe Fittings	40 LF	7	-	-	40 LF	
S1009	Assistant Principal's Office	04	9"x9" Floor Tile	120 SF	X			120 SF	Unable to Locate Material

ASSESSMENT CATEGORIES

1. = Damaged or Significantly Damaged TSI ACBM
2. = Damaged Friable Surfacing ACBM
3. = Significantly Damaged Friable Surfacing ACBM
4. = Damaged or Significantly Damaged Friable Miscellaneous ACBM
5. = ACBM with Potential for Damage
6. = ACBM with Potential for Significant Damage
7. = Any Remaining Friable ACBM or Friable Suspect ACBM
X. = Not Applicable (Material is Nonfriable Surfacing or Miscellaneous Material)

HAZARD RESPONSE TABLE

RESPONSE ACTION #	HAZARD RESPONSE ACTION	ASBESTOS MATERIAL Yes or No	FRIABLE Yes or No	DAMAGED Yes or No	POTENTIAL DISTURBANCE High, Moderate, Low	AIR FLOW Yes or No	ETC Rating	CLASS OF WORK
1	REMOVE ASAP	YES	YES	YES SIGNIFICANT	N/A	N/A	POOR	CLASS I
2	REPAIR, REMOVE, REDUCE DISTURBANCE ASAP	YES	YES	YES	HIGH	N/A	POOR	CLASS I or II
3	REPAIR, REMOVE, REDUCE DISTURBANCE ASAP	YES	YES	YES	MODERATE	YES	POOR	CLASS I or II
4	REPAIR, THEN O&M	YES	YES	YES	MODERATE	NO	POOR	CLASS I, II or III
5	REPAIR, THEN O&M	YES	YES	YES	LOW	YES	POOR	CLASS I, II or III
6	O&M AND THEN SCHEDLE REPAIR	YES	YES	YES	LOW	NO	FAIR	CLASS III or IV
7	REDUCE POTENTIAL FOR DISTURBANCE AND THEN O&M	YES	YES	NO	HIGH	N/A	FAIR	CLASS I, II, III or IV
8	O&M AND THEN REMOVE DISTURBANCE POTENTIAL	YES	YES	NO	MODERATE	N/A	FAIR	CLASS IV
9	O&M	YES	YES	NO	LOW	N/A	GOOD	CLASS IV
10	O&M AND FLOOR CARE/REPAIR	YES	NO	YES	N/A	N/A	FAIR	CLASS III or IV
11	O&M	YES	NO	NO	N/A	N/A	GOOD	CLASS IV

Notes:

N/A = Not Applicable

Damaged Floor Tile - Falls into response action # 10

Significant Damage - Any material with greater than 10 percent overall damage or greater than 25 percent localized damage

Damage - Any material with less than 10 percent overall damage or less than 25 percent localized damage

Ari Flow - Area where Plenums, Air Shaft, Elevator Shaft, Ventilation Shaft, etc., create air flow that can cause erosion of materials

APPENDIX 4:

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: A1002 **Space Description:** Mechanical Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	75 LF	0 LF	Aircell Pipe Insulation Observed in Plenum Leading to Lobby
02	Pipe Fittings	Yes	10 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: A1028 **Space Description:** Fitness Center

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	8 LF	0 LF	
03	Vibration Cloth	No	60 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: A1029 **Space Description:** D Gym

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	20 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B100P **Space Description:** Plenum Above Auditorium

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	100 LF	25 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B1022 **Space Description:** Slop Sink

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	No	6 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B1023A **Space Description:** Women's Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	No	2 LF	0 LF	Assumed Present in Wall

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

AHERA 3 YEAR RE-INSPECTION AND

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6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B1024A
Space Description: Men's Room
School District: Chappaqua Central School District
School Name: Horace Greeley High School
Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng
Date: June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	No	2 LF	0 LF	Assumed Present in Wall

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	**July 2025**

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B1033A **Space Description:** Drama Office

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
04	9”x9” Floor Tile	No	25 SF	0 SF	Inaccessible

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: B1034 **Space Description:** Set Shop

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	25 LF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: C1014 **Space Description:** Life School Office

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
04	9”x9” Floor Tile	No	200 SF	0 SF	12”x12” Floor Tile Observed (Grey)

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: C1016 **Space Description:** Room C4

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
04	9”x9” Floor Tile	No	650 SF	0 SF	12” x 12” Floor Tile Observed (Grey)

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
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5				

Date Next 3 Year Re-inspection is Required	**July 2025**

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: E1000P **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	100 LF	0 LF	No Access

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: F1000P **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	100 LF	0 LF	No Access

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: F1009 **Space Description:** Office

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	12”x12” Floor Tile	No	100 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: F1010 **Space Description:** Kitchen

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	12”x12” Floor Tile	No	200 SF	0 SF	Custodian notes there are likely red tiles beneath 12” x 12”

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G1000P **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	285 LF	0 LF	No Access

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G2001A **Space Description:** Supply Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	12”x12” Floor Tile	No	100 SF	0 SF	Under Carpet

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G2001B **Space Description:** Bathroom

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
05	12”x12” Floor Tile	No	100 SF	0 SF	12"x12" Black FT, Self-Adhesive above VAT

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G2002 **Space Description:** Digital Art

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	8 LF	0 LF	Above Ceiling Tile

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G---
Space Description: Electrical Conduit Room
School District: Chappaqua Central School District
School Name: Horace Greeley High School
Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng
Date: June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	10 LF	0 LF	In Custodial Office Area, Above Ceiling Tile

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G2005 **Space Description:** Wood Shop Storage

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	10 LF	0 LF	Above Ceiling Tile

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: G2012 **Space Description:** Photo Lab

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	10 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1000P **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	300 LF	0 LF	No Access

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1001 **Space Description:** Bathroom Locker Area (Kitchen Staff_

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	6 LF	0 LF	
04	9”x9” Floor Tile	No	75 SF	0 SF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1004 **Space Description:** Foyer

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	40 LF	0 LF	
02	Pipe Fittings	Yes			

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
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4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1005 **Space Description:** Electrical Vault

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	6 LF	0 LF	
02	Pipe Fittings	Yes			

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1006 **Space Description:** Electrical Closet

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	40 LF	0 LF	
02	Pipe Fittings	Yes			

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

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Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1008 **Space Description:** Electrical Closet

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	5 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1010 **Space Description:** Garage Storage Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	175 LF	25 LF	
02	Pipe Fittings	Yes		0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1011 **Space Description:** Garage 1

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	9 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1011A **Space Description:** Garage 1 Storage Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	10 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: H1011B **Space Description:** Garage 1 Mechanical Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	40 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: K000U **Space Description:** Sub-Floor Pipe Chase

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
01	Pipe Insulation	Yes	1,300 LF	0 LF	No Access

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: K1000P **Space Description:** Hallway Plenum

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	1,300 LF	0 LF	Above Drop Ceiling

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	**July 2025**

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: K1020 **Space Description:** Mechanical Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	30 LF	0 LF	New Fiberglass Insulation

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: LBSMT **Space Description:** Storage Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	5 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: LBSMT **Space Description:** Garage

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	8 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: LBSMT **Space Description:** Mechanical Room

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
02	Pipe Fittings	Yes	40 LF	0 LF	

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

[1] Material Condition, Accessibility to Public, Warning Labels, etc.

500 Summit Drive, Suite 450
Valhalla, New York 10595

AHERA 3 YEAR RE-INSPECTION AND 6 MONTHS PERIODIC SURVEILLANCE FORM

ASBESTOS CONTAINING BUILDING MATERIALS

Space ID: S1009 **Space Description:** Assistant Principal's Office

School District: Chappaqua Central School District

School Name: Horace Greeley High School

Re-inspected By: Dmitri Kirnossenko, Williams Ng-Feng **Date:** June 7, 2022

Homogeneous Area #	Homogeneous Area Description	Friable (Yes/No)	Quantity	Damage Quantity	Notes [1]
04	9"x9" Floor Tile	No	120 SF	0 SF	Unable To Locate Material

6 MONTHS PERIODIC SURVEILLANCES

No.	Inspection Date	Name of Inspector	Asbestos Containing Building Materials Condition Notes	Fiber Release Episodes (Y/N)
1				
2				
3				
4				
5				

Date Next 3 Year Re-inspection is Required	July 2025

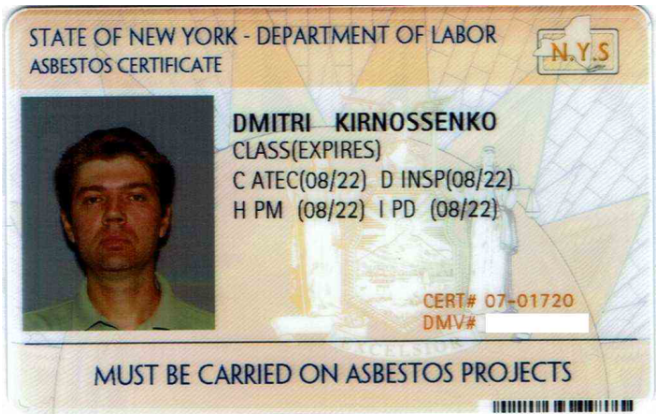
[1] Material Condition, Accessibility to Public, Warning Labels, etc.

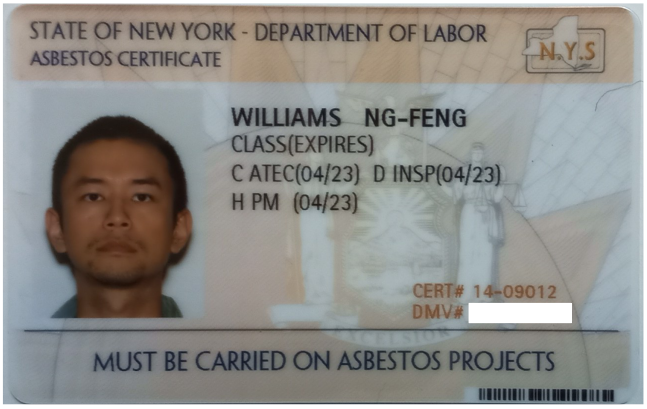
APPENDIX 5:

BULK SAMPLE ANALYSIS RESULTS AND PREVIOUS SAMPLING DATA

APPENDIX 6:

INSPECTOR AND MANAGEMENT PLANNER CERTIFICATIONS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
DMITRI KIRNOSSENKO
CLASS(EXPIRES)
C ATEC(08/22) D INSP(08/22)
H PM (08/22) I PD (08/22)
CERT# 07-01720
DMV#
MUST BE CARRIED ON ASBESTOS PROJECTS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
WILLIAMS NG-FENG
CLASS(EXPIRES)
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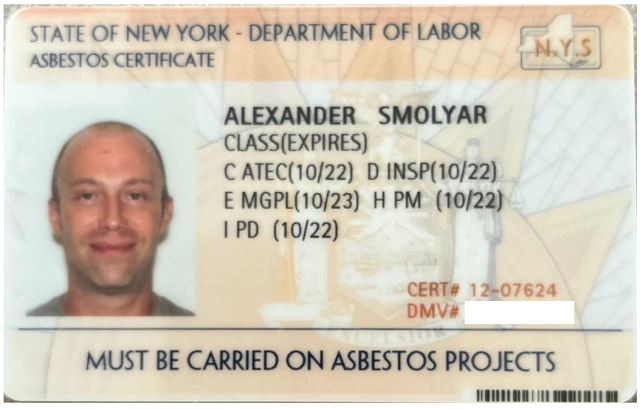
H PM (04/23)
CERT# 14-09012
DMV#
MUST BE CARRIED ON ASBESTOS PROJECTS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
ALEXANDER SMOLYAR
CLASS(EXPIRES)
C ATEC(10/22) D INSP(10/22)
E MGPL(10/23) H PM (10/22)
I PD (10/22)
CERT# 12-07624
DMV#
MUST BE CARRIED ON ASBESTOS PROJECTS

APPENDIX 7:

SUMMARY OF ABATEMENT ACTIVITIES

APPENDIX 8:

40 CFR PART 763 (EPA AHERA)

INFORMATION AVAILABLE TO BIDDERS

1.1 GENERAL

A. Hazardous Material Information: Data in hazardous material investigation reports included herein are provided to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between sampling locations. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

_____

(Name of Bidder)

BID FORM CONTRACT NO. 1 - GENERAL CONSTRUCTION WORK
FOR
DISTRICT-WIDE CAPITAL IMPROVEMENTS - HIGH SCHOOL & MIDDLE SCHOOL HVAC UPGRADES

Chappaqua Central School District
District Administration Office, Purchasing Office
66 Roaring Brook Road
Chappaqua, New York 10514
Attention: Anne Holmquist, Purchasing Agent

1. The Undersigned hereby declares that it has carefully examined all Bidding and Contract Documents and has inspected the actual location of Work, together with the local sources of supply, and has satisfied itself as to all quantities and conditions, and understands that in signing this Proposal, it waives all rights to plead any misunderstanding regarding the same.

2. The Undersigned further understands and agrees that it is to do, perform and complete all the Work in accordance with the Contract Documents and Contract and to accept in full compensation therefor, the amount of the Base Bid, modified by such additive or deductive alternatives, if any, as are accepted by the Owner.

3. In submitting this Bid, the Undersigned agrees:

   a. To hold the Bid open for forty-five (45) days after Bid Opening.
   b. To accept the provisions of the Instructions to Bidders.
   c. To enter into and execute a Contract within ten (10) days of the Notice of Award issue date, and to simultaneously furnish Performance and Labor and Material Bonds.
   d. To commence the Work immediately upon receipt of Notice of Award.

4. The Undersigned agrees that the Work proposed herein will be Substantially Complete by the dates indicated in specification Section 011000 - "Summary" and in the Project Milestone Schedule following Section 011000.

5. The Undersigned understands that the Owner reserves the right to accept or reject any or all Bids and to waive any informalities in the bidding.

6. The Undersigned acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein:

Addendum Number	Date of Addendum
_____	_____
_____	_____
_____	_____

_____
(Name of Bidder)

7. **BASE BID**

All labor, material, services and equipment necessary for completion of the Work shown on the Drawings and the Technical Specifications for General Construction Work:

$ _____ (In numbers)

_____ Dollars
(in words)

8. **ALTERNATES** - none

9. **UNIT PRICES**

The Undersigned agrees to perform all work as drawn and specified for the following items at the unit prices given:

Unit Price No. 1 - Hazardous Material Abatement of Gypsum Board Compound: All work required for abatement of gypsum board compound, for the unit price per square foot of:

_____ Dollars ($ _____)

Unit Price No. 2 - Hazardous Material Abatement of Tar Paper/Mastic on Metal Deck: All work required for abatement of tar paper/mastic on metal deck (bottom layer under 12" of roofing materials), for the unit price per square foot of:

_____ Dollars ($ _____)

Unit Price No. 3 - Hazardous Material Abatement of Pipe Insulation/Fittings: All work required for abatement of pipe insulation/fittings, for the unit price per linear foot of:

_____ Dollars ($ _____)

Unit Price No. 4 - Hazardous Material Abatement of Duct Insulation Coating: All work required for abatement of duct insulation coating, for the unit price per square foot of:

_____ Dollars ($ _____)

Unit Price No. 5 - Hazardous Material Abatement of Caulking Associated with HVAC System: All work required for abatement of caulking associated with HVAC system, for the unit price per linear foot of:

_____ Dollars ($ _____)

Unit Price No. 6 - Hazardous Material Abatement Re-Mobilization Outside of Base Bid Work: All work required for re-mobilization for hazardous materials abatement work outside of Base Bid work, for the unit price per occurrence of:

_____ Dollars ($ _____)

Unit Price No. 7 - Plaster and Lath Repair: All work required for provision of repair of plaster and lath at ceilings and walls of Bell MS gym, for the unit price per square foot of:

_____ Dollars ($ _____)

Unit Price No. 8 - Acoustical Ceiling Tile ACT Ceiling and Grid Replacement: All work required for replacement of ceiling tile and grid for acoustical ceiling type ACT as specified in Section 095113, for the unit price per square foot of:

_____ Dollars ($ _____)

Unit Price No. 9 - Acoustical Ceiling Tile Ceiling and Grid Replacement to Match Existing at High School: All work required for replacement of existing ceiling tile and grid at High School, for the unit price per square foot of:

_____ Dollars ($ _____)

10. **ALLOWANCES** - none

The Undersigned has attached the following documents to this Bid:

a. Certificate of Compliance with the Iran Divestment Act
b. Non-Collusion Affidavit
c. Sexual Harassment Policy and Training Certification
d. Bid Security
e. Statement of Bidder's Qualifications AIA Document A305, including Exhibits A, B, C, D and E.

_____ (If corporation, affix
Legal name of person, partnership, joint venture, limited liability company, or corporation (please type) corporate seal)

_____
Address (please type)

_____
Federal ID No. or Social Security No. (please type)

_____
Phone No. (please type)

_____
e-mail address for company (please type)

_____
Company URL

_____
(Name of Bidder)

_____
Name and title of signer (please type)

_____ _____
Signature Date

If a Corporation
Name Address

_____ , PRESIDENT _____

_____ , SECRETARY _____

_____ , TREASURER _____

If a Partnership
Name of Partners Address

_____ _____

_____ _____

_____ _____

If a Joint Venture
Name of Members Address

_____ _____

_____ _____

_____ _____

If an Individual
Name of Individual Address

_____ _____

If a Limited Liability Company (LLC)
Name of Members Address

_____ _____

_____ _____

_____ _____

_____

(Name of Bidder)

IF AWARDED THE CONTRACT:

_____

Contract Signatory (name and title)

_____

Project Manager (name, e-mail address and cell phone number)

_____

(Name of Bidder)

BID FORM CONTRACT NO. 2 - HVAC WORK
FOR
DISTRICT-WIDE CAPITAL IMPROVEMENTS - HIGH SCHOOL & MIDDLE SCHOOL HVAC UPGRADES

Chappaqua Central School District
District Administration Office, Purchasing Office
66 Roaring Brook Road
Chappaqua, New York 10514
Attention: Anne Holmquist, Purchasing Agent

1. The Undersigned hereby declares that it has carefully examined all Bidding and Contract Documents and has inspected the actual location of Work, together with the local sources of supply, and has satisfied itself as to all quantities and conditions, and understands that in signing this Proposal, it waives all rights to plead any misunderstanding regarding the same.

2. The Undersigned further understands and agrees that it is to do, perform and complete all the Work in accordance with the Contract Documents and Contract and to accept in full compensation therefor, the amount of the Base Bid, modified by such additive or deductive alternatives, if any, as are accepted by the Owner.

3. In submitting this Bid, the Undersigned agrees:

   a. To hold the Bid open for forty-five (45) days after Bid Opening.
   b. To accept the provisions of the Instructions to Bidders.
   c. To enter into and execute a Contract within ten (10) days of the Notice of Award issue date, and to simultaneously furnish Performance and Labor and Material Bonds.
   d. To commence the Work immediately upon receipt of Notice of Award.

4. The Undersigned agrees that the Work proposed herein will be Substantially Complete by the dates indicated in specification Section 011000 - "Summary" and in the Project Milestone Schedule following Section 011000.

5. The Undersigned understands that the Owner reserves the right to accept or reject any or all Bids and to waive any informalities in the bidding.

6. The Undersigned acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein:

Addendum Number	Date of Addendum
_____	_____
_____	_____
_____	_____

_____
(Name of Bidder)

7. **BASE BID**

All labor, material, services and equipment necessary for completion of the Work shown on the Drawings and the Technical Specifications for HVAC Work:

$ _____ (In numbers)

_____ Dollars
(in words)

8. **ALTERNATES** - none

9. **UNIT PRICES** - none

10. **ALLOWANCES** - none

The Undersigned has attached the following documents to this Bid:

a. Certificate of Compliance with the Iran Divestment Act
b. Non-Collusion Affidavit
c. Sexual Harassment Policy and Training Certification
d. Bid Security
e. Statement of Bidder's Qualifications AIA Document A305, including Exhibits A, B, C, D and E.

_____ (If corporation, affix
Legal name of person, partnership, joint venture, limited liability company, or corporation (please type) corporate seal)

_____
Address (please type)

_____
Federal ID No. or Social Security No. (please type)

_____
Phone No. (please type)

_____
e-mail address for company (please type)

_____
Company URL

_____
Name and title of signer (please type)

_____ _____
Signature Date

_____
(Name of Bidder)

If a Corporation
Name Address

_____ , PRESIDENT _____

_____ , SECRETARY _____

_____ , TREASURER _____

If a Partnership
Name of Partners Address

_____ _____

_____ _____

_____ _____

If a Joint Venture
Name of Members Address

_____ _____

_____ _____

_____ _____

If an Individual
Name of Individual Address

_____ _____

If a Limited Liability Company (LLC)
Name of Members Address

_____ _____

_____ _____

_____ _____

IF AWARDED THE CONTRACT:

_____
Contract Signatory (name and title)

_____
Project Manager (name, e-mail address and cell phone number)

_____

(Name of Bidder)

BID FORM CONTRACT NO. 3 - ELECTRICAL WORK
FOR
DISTRICT-WIDE CAPITAL IMPROVEMENTS - HIGH SCHOOL & MIDDLE SCHOOL HVAC UPGRADES

Chappaqua Central School District
District Administration Office, Purchasing Office
66 Roaring Brook Road
Chappaqua, New York 10514
Attention: Anne Holmquist, Purchasing Agent

1. The Undersigned hereby declares that it has carefully examined all Bidding and Contract Documents and has inspected the actual location of Work, together with the local sources of supply, and has satisfied itself as to all quantities and conditions, and understands that in signing this Proposal, it waives all rights to plead any misunderstanding regarding the same.

2. The Undersigned further understands and agrees that it is to do, perform and complete all the Work in accordance with the Contract Documents and Contract and to accept in full compensation therefor, the amount of the Base Bid, modified by such additive or deductive alternatives, if any, as are accepted by the Owner.

3. In submitting this Bid, the Undersigned agrees:

   a. To hold the Bid open for forty-five (45) days after Bid Opening.
   b. To accept the provisions of the Instructions to Bidders.
   c. To enter into and execute a Contract within ten (10) days of the Notice of Award issue date, and to simultaneously furnish Performance and Labor and Material Bonds.
   d. To commence the Work immediately upon receipt of Notice of Award.

4. The Undersigned agrees that the Work proposed herein will be Substantially Complete by the dates indicated in specification Section 011000 - "Summary" and in the Project Milestone Schedule following Section 011000.

5. The Undersigned understands that the Owner reserves the right to accept or reject any or all Bids and to waive any informalities in the bidding.

6. The Undersigned acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein:

Addendum Number	Date of Addendum
_____	_____
_____	_____
_____	_____

_____
(Name of Bidder)

7. **BASE BID**

All labor, material, services and equipment necessary for completion of the Work shown on the Drawings and the Technical Specifications for Electrical Work:

$ _____ (In numbers)

_____ Dollars
(in words)

8. **ALTERNATES**

The Undersigned agrees to provide all work in accordance with the requirements of the Specifications and the Drawings and includes all costs of related coordination, modification, or adjustment for the following:

ALTERNATE NO. HG-1: TEMPORARY ELECTRIC

ADD _____ Dollars ($ _____)

9. **UNIT PRICES** - none

10. **ALLOWANCES** - none

The Undersigned has attached the following documents to this Bid:

a. Certificate of Compliance with the Iran Divestment Act
b. Non-Collusion Affidavit
c. Sexual Harassment Policy and Training Certification
d. Bid Security
e. Statement of Bidder's Qualifications AIA Document A305, including Exhibits A, B, C, D and E.

_____ (If corporation, affix
Legal name of person, partnership, joint venture, limited liability company, or corporation (please type) corporate seal)

_____
Address (please type)

_____
Federal ID No. or Social Security No. (please type)

_____
Phone No. (please type)

_____
e-mail address for company (please type)

_____
(Name of Bidder)

_____
Company URL

_____
Name and title of signer (please type)

_____ _____
Signature Date

If a Corporation
Name Address

_____ , PRESIDENT _____

_____ , SECRETARY _____

_____ , TREASURER _____

If a Partnership
Name of Partners Address

_____ _____

_____ _____

_____ _____

If a Joint Venture
Name of Members Address

_____ _____

_____ _____

_____ _____

If an Individual
Name of Individual Address

_____ _____

If a Limited Liability Company (LLC)
Name of Members Address

_____ _____

_____ _____

_____ _____

_____

(Name of Bidder)

IF AWARDED THE CONTRACT:

_____

Contract Signatory (name and title)

_____

Project Manager (name, e-mail address and cell phone number)

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

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

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

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

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

I, _____, being duly sworn, deposes and says that

he/she is the _____ of the _____ Corporation

and that neither the Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

SIGNED: _____

SWORN to before me this _____ day of _____ 202____

Notary Public: _____

OR

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_____202____

Notary Public: _____

NON-COLLUSION AFFIDAVIT

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 the party's 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 that 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

I, herby affirm under the penalties of perjury that the foregoing statement is true.

Dated: _____ Signed _____

_____
(Print Name)

_____
(Title)

SEXUAL HARASSMENT POLICY AND TRAINING CERTIFICATION

I, _____, being duly sworn, deposes and
(Name of Individual Signing this Certification)

says that I am the _____ of the _____
(Title/Position of Signer) (Name of Bidder)

and that by submission of this bid, I certify on behalf of the above-named bidder, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the above-named 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. I certify on behalf of the above-named bidder/proposer, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that such policy, at a minimum, meets the requirements of Section 201-g of the New York State Labor Law.

By: _____
Signature

_____
Title

Sworn to before me this

_____day of _____, 20___

_____
Notary Public

Commission Expires:_____

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)
Town-Village of Harrison Purchasing Department
One Heineman Place, Harrison, NY 10528

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)

ADDITIONS AND DELETIONS:
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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.

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 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.

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User Notes: (1933002355)

Signed and sealed this day of ,

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

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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. 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.

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User Notes: (1831822456)

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.

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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.

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§ 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)

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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.)

ADDITIONS AND DELETIONS:
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§ 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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User Notes: (1128424747)

.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?

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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.

ADDITIONS AND DELETIONS:
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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?

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§ 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				

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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
(In words, indicate day, month, and year.)

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

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

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

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

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

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.

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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in 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.

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.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

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§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

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.)

[ ] 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.

§ 4.2.2 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.)

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Item	Price	Conditions for Acceptance

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

Item	Price

§ 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)

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.3.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rental rate paid at the place of the Project.

§ 4.3.6 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)

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager, within 14 days of executing this Agreement, a written Control Estimate for the Owner's review and approval. The Control Estimate shall include the items in Section B.1 of Exhibit B, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price

§ 4.4.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.4.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

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§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rental rate paid at the place of the Project.

§ 4.4.6 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)

§ 4.4.7 Guaranteed Maximum Price
§ 4.4.7.1 The Contract Sum is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by Change Order as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

§ 4.4.7.2 Alternates
§ 4.4.7.2.1 Alternates, if any, included in the Guaranteed Maximum Price:

Item	Price

§ 4.4.7.2.2 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

§ 4.4.7.3 Allowances, if any, included in the Guaranteed Maximum Price:
(Identify each allowance.)

Item	Price

§ 4.4.7.4 Assumptions, if any, upon which the Guaranteed Maximum Price is based:
(Identify each assumption.)

§ 4.4.8 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes, or equipment, all of which, if required, shall be incorporated by Change Order.

§ 4.4.9 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 4.4.7.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 4.4.7.4 and the revised Contract Documents.

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

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§ 4.6 Other:
(Insert provisions for bonus, cost savings or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and 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 day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ( ) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 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. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values 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.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, 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;
- **.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 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; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

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§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price

§ 5.1.5.1 With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit B, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices, or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor, plus payrolls for the period covered by the present Application for Payment, less that portion of the payments attributable to the Contractor's Fee.

§ 5.1.5.2 Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.

§ 5.1.5.3 In accordance with AIA Document A232-2019 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

.1 The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;

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

.3 The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

§ 5.1.5.3.2 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;

.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 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;

.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; (2) that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

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§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 5.1.6.2 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 Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Contractor's Fee.

§ 5.1.6.2.1 The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.6.2.2 The allocation of the Guaranteed Maximum Price under this Section 5.1.6.2 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

§ 5.1.6.2.3 When the Contractor allocates costs from a contingency to another line item in the schedule of values, the Contractor shall submit supporting documentation to the Architect and Construction Manager.

§ 5.1.6.3 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. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work and for which the Contractor has made payment or intends to make payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 5.1.6.4 In accordance with AIA Document A232-2019, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

- **.1** That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;
- **.2** That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and
- **.4** The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

§ 5.1.6.4.2 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;
- **.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;

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.4 For Work performed or defects discovered since the last payment application, any amount for which the 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;

.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.6.5 The Owner and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.6.6 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.6.7 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6.8 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

§ 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.)

§ 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.)

§ 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.)

§ 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.)

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§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 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 Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 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, or as follows:

§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 5.2.2.1 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 Article 12 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 Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and

.3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.

§ 5.2.2.2 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, or as follows:

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

§5.4 Nothwithstanding any provision which might be read to be to the contrary, payments shall be made consistent with the requirements of New York State General Municipal Law §106-b.

%

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, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

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

[X] Litigation in a court of competent jurisdiction.

[ ] Other: *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

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.

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

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

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 7.2.1 Termination

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

§ 7.2.1.2 Termination by the Owner for Cause

§ 7.2.1.2.1 If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:

.1 Take the Cost of the Work incurred by the Contractor to the date of termination;

.2 Add the Contractor's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A232–2019.

§ 7.2.1.2.2 When the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, if the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232-2019, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A232-2019 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.1.2.1.

§ 7.2.1.2.3 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Contractor will contain provisions allowing for assignment to the Owner as described above.

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§ 7.2.1.3 Termination by the Owner for Convenience

If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of or method for determining the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 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)

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

§ 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 Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, 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.)

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§ 8.7 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

§ 8.8 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

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

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

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

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

[ ] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[ ] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

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[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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Additions and Deletions Report for

AIA® Document A132® – 2019

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 11:52:31 ET on 09/17/2024.

PAGE 10

§5.4 Nothwithstanding any provision which might be read to be to the contrary, payments shall be made consistent with the requirements of New York State General Municipal Law §106-b.

PAGE 11

[**X**] Litigation in a court of competent jurisdiction.

PAGE 12

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with ~~a building information modeling exhibit,~~ 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 ~~a building information modeling exhibit,~~ 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.)

PAGE 13

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

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , 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 11:52:31 ET on 09/17/2024 under Order No. 3104238611 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A132™ – 2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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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)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ 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:
(Architect, Engineer or other party:)

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.
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§ 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.

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§ 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.

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§ 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:	

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AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

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 Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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.

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§ 1 The Contractor and 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, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 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 Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 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 the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 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.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, 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.

§ 13 Notice and Claims 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. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 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.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 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 Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. 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.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 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.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 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.

§ 18 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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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)

Chappaqua Central School District
District-Wide Capital Improvements – High School & Middle School HVAC Upgrades
Horace Greeley HS – SED# 66-10-04-06-0-015-023
Seven Bridges MS – SED# 66-10-04-06-0-036-007
Robert E. Bell Middle School – SED# 66-10-04-06-0-009-025

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

Empire Core Construction
199 Main Street, FL 10
White Plains, New York 10601
Tel. No. 212.494.0003

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

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, NY 10514

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

KG+D Architects, PC
285 Main Street
Mount Kisco, New York 10549

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.

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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 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. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. 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 agreed upon in writing. 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.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, 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.

§ 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.

§ 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.

§ 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.

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§ 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. Should any of the Contract Documents be inconsistent in themselves or with each other, the Contractor shall request written clarification from the Construction Manager and/or the Architect and/or the Owner to resolve any such inconsistency. Where a typical or representative detail is shown in the Drawings, such detail shall constitute the standard of workmanship and materials throughout corresponding portions of the Work in a manner that is satisfactory to the Construction Manager and the Owner.

§ 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 Documents 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 Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 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.

§ 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 No obligation of the Architect to the Owner, pursuant to its separate agreement with the Owner, shall be construed as intended for the benefit of the Contractor. Nothing in the Contract Documents shall create or give rise to any duty whatsoever on the part of the Architect to the Contractor.

§ 1.2.5 No obligation of the Construction Manager to the Owner, pursuant to its separate agreement with the Owner, shall be construed as intended for the benefit of the Contractor. Nothing in the Contract Documents shall create or give rise to any duty whatsoever on the part of the Construction Manager to the Contractor.

§1.2.5 All Work indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.

§ 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.

§ 1.4.1 Severability. In the event that any term or provision, or part thereof, of this General Conditions and the Contract Documents is held to be illegal, invalid or unenforceable under applicable law by a court of competent jurisdiction, such term or provision, or part thereof, shall be deemed ineffective, to the extent of such invalidity or unenforceability only, and severed from this General Conditions and/or the Contract Documents and the remaining term(s) and provision(s) shall remain unaffected thereby.

§ 1.4.2 Captions. Titles or captions of Articles, Sections, and Exhibits contained in this General Conditions and the Contract Documents are inserted only as a matter of convenience and for reference, and in no way define, limited, extend or describe the scope of this General Conditions or the Contract Documents or the intent of any provision

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hereof. All Exhibits referenced in the Agreement are deemed attached hereto and incorporated in the Agreement by reference.

§ 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, except to the extent of the Owner's rights as set forth in the Owner-Architect Agreement applicable to the Project Work , 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 shall not own or 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.

§ 1.6 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.

§ 1.9 Public Communication / Confidentiality – Use and Disclosure of Project Information

Any public communications or disclosure of materials or information with respect to the Project by the Contractor and its employees and Subcontractors, except as required by law, shall be subject to the Owner's prior written approval, including, without limitation, any promotional, marketing, media or other material or information relating to the Owner or the Project.

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 Board of Education of the Owner shall be the only entity with authority to bind the Owner or provide approval or authorization on behalf of the Owner as required by law and/or the policies and procedures of the Owner unless the Contractor is notified otherwise in writing signed by the Owner. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters

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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 who is designated in writing by the Owner

§ 2.1.2 The Owner shall furnish to the Contractor, after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights

§ 2.2 Information and Services Required of the Owner

(Paragraph deleted)

§ 22.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.2 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.

§ 2.2.3 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.

§ 2.2.4 If requested by the Contractor in writing the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. . Any and all additional copies will be furnished to the Contractor at its own expense (including the cost of reproducing, postage and handling).

§ 2.2.7 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.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or fails to carry out Work in accordance with the Contract Documents, the Owner may by written order signed personally or by an agent so empowered by the Owner, may order 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, except to the extent required by Section 6.1.3.

(Paragraphs deleted)

§ 2.4 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 and fails within a three(3)day period after receipt of 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) day period.without prejudice to other remedies the Owner may have, immediately correct such default or neglect and complete any portion or all of the

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Work. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure, and the Owner's expenses, including, but not limited to, attorneys' fees.. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15. . Such Change Order shall be deemed to have been executed by the Contractor, whether or not actually signed by the Contractor. Notwithstanding anything contained in the Contract Documents to the contrary, written shall be deemed received by Contractor if sent via e-mail.

(Paragraphs deleted)

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.

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

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their assistance with the Owner in its 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 and examined the Project site, that it has examined all physical, legal, and other conditions affecting the Work and that it has become familiar with local conditions (including, but not limited to, layout, nature, surrounding areas, climatic conditions, anticipated labor supply and costs, availability and costs of materials, tools and equipment, etc.) under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 The Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the 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, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor.The Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager, Owner and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Contractor acknowledges and warrants that it has examined all the Contract Documents, that they are suitable and sufficient to enable Contractor to complete the Work in a timely manner.

§ 3.2.3 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 Owner, Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Owner, Construction Manager and Architect may require.

§ 3.2.4 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 requests for information pursuant to Sections 3.2.2 or 3.2.3,

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the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, 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 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.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. 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 under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors 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.

§ 3.3.3 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.

§3.3.4 Contractor shall attend scheduled project meetings with Construction Manager and Architect (and/or any representatives thereof) at reasonable times and places and present status reports, in a format agreed to by Construction Manager, on the progress of the Work. Construction Manager or, if requested by the Owner, Contractor shall prepare detailed written minutes of each project meeting and, if requested by the Owner, shall furnish copies thereof to the Owner.

§ 3.3.5 Contractor shall schedule and attend regular job and coordination meetings with Subcontractors and the Construction Manager (if the Construction Manager deems it appropriate to attend), and present on safety, the Project's schedule, request for information status, submittal, contract coordination, material storage, and progress of the Work. If requested by Construction Manager or Owner, Contractor shall prepare detailed written minutes of each job and coordination meeting and within a reasonable time after the meeting shall furnish copies thereof to Owner and Construction Manager.

§ 3.3.5 Contractor shall prepare and maintain on a daily basis: signed daily reports showing, among other things, the Contractor's employees at the site, the Subcontractors at the site and number of employees of each, the general work (and location of same) performed by Contractor and/or Subcontractors, the names of persons (such as, but not limited to, Construction Manager, Owner's representatives, Architect, consultants, inspectors, investigators, and other persons not generally at the site on a daily basis) at the site, temperature and weather conditions, and description in reasonable detail of any extraordinary or special occurrences. Contractor shall make all such reports available to and/or deliver copies of such to the Construction Manager and Owner promptly upon Construction Manager's or Owner's request.

§ 3.3.6 Contractor shall provide to Owner and/or Construction Manager, as Owner or Construction Manager may reasonably request, copies of all correspondence, memoranda and bulletins, and other like documents, to and from the Construction Manager, Architect, consultants, Subcontractors, suppliers, public agencies, and others on the Project.

§ 3.3.7 Contractor agrees that it shall not permit any unauthorized persons or entities to visit or enter upon the Project absent Owner's prior approval.

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§ 3.3.8 Contractor shall arrange for reasonable protection to secure the site against theft and vandalism and arrange for reasonable protection of adjoining property in agreement with Owner.

§ 3.3.9 Contractor must exert due care and diligence when working in or near any existing buildings or site work which is to remain. The absence of protection around such items shall not excuse the Contractor from its responsibility to provide protection. Any damages due to the Contractor's failure to discharge such responsibilities to the existing buildings, site work or facilities shall be repaired by the Contractor at its sole cost and expense and if Contractor cannot repair the same, it shall bear the cost thereof.

§ 3.3.11 Contractor shall develop methods of dust and fume control so as to comply with applicable legal requirements.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, 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. The Contractor shall check all materials and labor included in the Work and entering into the Work site and shall keep full detailed accounts thereof.

§ 3.4.1.1 Contractor agrees to furnish sufficient staff with the requisite experience (in comparable projects – type, size and location) and competent full-time Project construction team familiar with local conditions for the overall performance of the Work of the Project to meet the overall "Milestone Schedule", found in the Specifications, developed by the Construction Manager and Architect, and approved by the Owner (also referred herein as "Project Schedule"). After approved by the Construction Manager, the primary members of the Project construction team shall not be reassigned or otherwise removed from the Project unless they leave the employ of the Contractor, or unless the Construction Manager or the Owner shall reasonably request a change, or the parties otherwise agree. The Construction Manager or Owner may reasonably request that any member of the Project construction team be removed, and in such event the Contractor shall make such change within seven (7) days after receipt of notice thereof. The Owner shall have the right to approve any replacement members of the Project construction team and shall similarly have the right to approve all other top-level supervisory and administrative personnel assigned full-time to the Project, and the same shall not be changed without the prior written consent of the Construction Manager. Construction Manager's approval and consent shall not be unreasonably withheld.

§ 3.4.2 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 Change Order or Construction Change Directive. Contractor shall inform the Construction Manager and Architect in writing of the nature of such requested deviations at the time the material is submitted for approval, and shall request written approval from the Owner of the deviation from the requirements of the Contract Documents.

§ 3.4.2.1 By submitting a request for approval of a deviation or substitute, Contractor warrants to Owner that: (a) it has investigated the proposed substitute product and determined that it is equal in all respects to the specified material, and (b) it will coordinate the installation of the substitute, and make the changes required to incorporate the substitute into the Work, without additional cost to Owner. Contractor shall provide, without cost to Owner, evidence leading to a reasonable certainty that the proposed substitution or deviation: (a) will provide a quality of result at least equal to the specified material; (b) is at least equal in serviceability to the specified material; (c) will not entail changes in details and construction of related Work other than those approved by Construction Manger or Architect to be performed at no additional cost to Owner; and (d) will provide a cost advantage (to be credited to Owner) or other benefit to Owner. All proposed substitutions shall be subject to Owner's final approval, which may be given or withheld in Owners sole discretion as set forth above.

§ 3.4.2.2 Any loss or damage arising from an unapproved substitution of any material or any method from those originally specified shall be borne by Contractor without cost to Owner, unless such substitution was made at the written request or direction of Owner.

§ 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

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skilled in tasks assigned to them Any worker or other person involved in the performance of the Work who, in the reasonable opinion of the Construction Manager or Owner, is incompetent or careless in the execution of the Work or otherwise unsatisfactory shall be forthwith removed upon the request of the Owner.

§ 3.4.3.1 The Contractor shall employ only labor on the Project or in connection with its Work capable of working harmoniously with all trades, crafts and any other individuals associated with the Work to be performed. It shall be the responsibility of the Contractor to anticipate and plan to mitigate any potential strikes, picketing, work stoppages, slowdowns or other disruptive labor related activity at or about the Project for any reason by anyone employed or engaged by the Contractor to perform 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 unimpeded with the Work under any circumstance. Contractor shall be responsible to perform all actions to mitigate and bear such costs associated with any strikes, picketing, work stoppages, slowdowns or other disruptive activity at or about the Project (for example and without limitation, signage, fencing, separate gates, temporary roads, reserved hours of Work for separate Subcontractors, security personnel, etc.) as deemed necessary by the Contractor, Construction Manager or Owner for the safety of the occupants of the site and progress of the Work pursuant to the Milestone Schedule.

§ 3.4.3.2 In case the progress of the Work to be performed by the Contractor is affected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to its Agreement with the Owner because of a conflict involving any labor agreement or regulation, the Owner may require the 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 pursuant to its Contract Documents.

§ 3.4.3.3 The Contractor shall ensure that its Work continues uninterrupted pursuant to the Project Schedule during the pendency of any labor dispute.

§ 3.5 Warranty

§ 3.5.1 In addition to all warranties provided to the Contractor by Subcontractors, consultants or others, copies of which the Contractor shall deliver and assign to the Owner, the Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of the best quality and new unless the Contract Documents require or permit otherwise. 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. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All manufacturers' warranties shall be addressed and assigned to the Owner and delivered to the Owner upon completion of the Work and received prior to the request for Final Payment. Contractor shall perform all Work in such a manner so as to obtain and preserve any and all such manufacturers' warranties.

§ 3.5.3 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

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. . The Owner, as identified on Page 1 of this General Conditions, is a nonprofit educational facility and is therefore "tax-exempt" in accordance with the applicable laws of the State of New York and with Chapter 32 of the Internal Revenue Code, as most recently amended, for collection of all sales and excise taxes. Exemption Certificates will be furnished, upon request, to the Contractor by the Owner.

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

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 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.

§ 3.7.3 If the Contractor performs Work where it knew or should have known it to be 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 the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. (the "Concealed Conditions"), the Contractor, as a condition precedent to making a Claim for an adjustment in the Contract Sum or the Contract Time as a result of such, shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than twenty-one (21) days after first observance of the Concealed Conditions. If the Contractor does not provide written notice to the Owner, through the Construction Manager, within the required time and otherwise in conformance with the requirements of such written notice, Contractor shall be deemed to have waived such Claim and shall not be entitled to make any Claim for any remedies for such Concealed Conditions, including Contract Time extension. The Architect and Construction Manager will investigate such conditions and, advise the Contractor in writing as to how to proceed, so as to minimize any delay to the Project. If the Architect, in consultation with the Construction Manager, determines that the conditions 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, an adjustment of actual cost in the Contract Sum or Contract Time, or both. If the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents, or otherwise do not fall within a category of a Concealed Conditions as set forth above, and that no change in the terms of the Contract (i.e. Contract Sum or the Contract Time) is justified, the Construction Manager shall promptly notify the Owner, Architect, and Contractor in writing, stating the reasons. Claims in opposition to such determination must be made within ten (10) days after the Owner has given notice of its determination.

§ 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, 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.

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

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§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule (" the Construction Schedule"), a Contractor's construction schedule for the Work. The Construiction 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 schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably 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, or fails to provide submittals in accordance with the approved 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.

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

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project Construction Schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. The Contractor's attention is directed to the necessity of keeping accurate records of all concealed Work so that "record" Drawings will contain this information in correct detail and locations. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work (or such earlier time as may be required by Owner) as a record of the Work as constructed.

§ 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

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the Work. "Shop Drawings" as used herein includes fabrication, erection, layout and setting drawings; manufacturers' standard drawings; samples; schedules; descriptive literature, catalogs and brochures; performance and test data; calculations; wiring and control diagrams; all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems and methods of construction as may be required to show that the materials, equipment or systems and the position thereof conform to the Contract Documents. Shop Drawings shall establish the actual detail of all manufactured or fabricated items; indicate proper relation to adjoining Work; amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure; and incorporate minor changes of construction to suit actual conditions.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor or Subcontractor 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 demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents 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.

§ 3.12.5 The Contractor shall review and cause all Subcontractors to submit required Shop Drawings and other submittals with such promptness as to cause no delay to the Project. The submittal schedule shall be issued at the start of construction and updated as reasonably agreed upon by the Owner and Contractor. Each Subcontractor shall submit all Shop Drawings and other submittals through the Contractor for the Construction Manager's review. Contractor shall receive, log and transmit Shop Drawings among Construction Manager, Architect, Owner's other consultants, if any, and Subcontractors, and promptly advise Construction Manager and Architect and Owner's other consultants, if any, and take all necessary action if any party shall fail to perform in accordance with agreed upon schedules. Contractor shall review for compliance with the Contract Documents. Review by the Construction Manager and/or the Architect, shall not relieve the Contractor from its responsibility in preparing and submitting proper Shop Drawings in accordance with the Contract Documents. Any submission which, in the Construction Manager's opinion, is incomplete or contains numerous errors or has not been checked or only checked superficially, will be returned unchecked by the Construction Manager for re-submission through the Contractor by Subcontractor. By submitting Shop Drawings, samples and other submittals, the Contractor represents that the Contractor (and the relevant Subcontractor) has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 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.

§ 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect 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

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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 notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 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, the Architect, and the Construction Manager 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. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 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.

§ 3.14 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.

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§ 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. 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.

§ 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. .Upon completion of the Work, and prior to final inspection and acceptance of same by the Owner, the Contractor shall thoroughly clean all Work, remedy any defects, and leave the Project in good condition. Specifically, ceiling and wall surfaces, floors, window/and door frames, hardware, metalwork and interior surfaces of glass shall be thoroughly cleaned. Contractor shall maintain streets and sidewalks around the Project site in a clean condition. The Contractor shall remove all spillage and tracking arising from the performance of the Work from such areas, and shall establish a regular maintenance program of sweeping and hosing to minimize accumulation of dirt and dust, upon such areas. The Contractor shall be responsible for broken glass, and at the completion of the Work shall replace such damaged or broken glass. After damaged or broken glass has been replaced the Contractor shall remove all labels on and wash and polish both sides of all glass. The Contractor shall also protect and relocate (to the extent relocation is required in connection with the Work) all existing trees around the Project site, and replace such trees upon the Substantial Completion of the Project (if such tree dies or is adversely affected by the Work), in accordance with all applicable laws or requirements.

§ 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.

§ 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 defend (with counsel acceptable to the Owner), indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them (the "Indemnified Parties") from and against claims, damages, losses, liabilities, demands, causes of action, judgments and expenses, including but not limited to attorneys' fees, of every kind and character that are caused by, attributable to, arise from, result from, or are in any way connected, in whole or in part, to: (a) Contractor or its Subcontractor(s) breach or failure to comply with the requirements of the Contract Documents; or (b) the performance of the Work or the operations or acts or omissions of Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable; including without limitation: (i) bodily injury, sickness, disease or death, and damage to or destruction of tangible property, including loss of use resulting therefrom (an "Indemnified Claim(s)"). The preceding obligations shall apply regardless of how, when or where such Indemnified Claim(s) occurs. All of the indemnification and hold harmless obligations herein and therein are subject and subordinate to the limitations of any applicable laws of the State of New York and in no event shall Contractor nor any other party be required to indemnify any person in violation of such applicable laws. It is further understood that in the event that a court of competent jurisdiction determines that any of the indemnification obligations of this General Conditions and the Contract Documents are unenforceable in whole or in part, Contractor's obligation to indemnify shall be replaced with the strictest enforceable indemnification provision allowable by such laws

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§ 3.18.1.1 Unless otherwise appropriately compensable as a Cost of the Work elsewhere in the Contract Documents, the Contractor's defense, indemnification and hold harmless obligations under this Contract shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees and expenses, as such are described above in **§ 3.18**) arising out of, or in connection with, any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code, or requirements of a public authority that bears upon the performance of the Work by the Contractor or any person or entity for whom it is responsible, (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fee approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor or any person or entity for whom it is responsible.

§ 3.18.1.2 Should Contractor fail to perform its duties to defend, indemnify and hold harmless any of the Indemnified Parties as required herein, and upon written notice by the Owner of such failure and allowing reasonable time for the Contractor to cure, the Owner and the other Indemnified Parties may defend or settle such Indemnified Claim(s) as they deem prudent, in the exercise of reasonable judgment, and the Contractor agrees to be bound by any such defense, settlement, judgment, or award that may result from such action by the Owner or the other Indemnified Parties. The rights of the Owner and Indemnified Parties pursuant to this paragraph shall not give rise to any duty on the part of the Owner or any Indemnified Party to exercise such rights for its benefit or the benefit of the Contractor or any other person or entity.

§ 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. . It is expressly understood that the Contractor indemnity and hold harmless obligations shall also include all expenses, including reasonable attorneys' fees and expenses (as such are described above in **§ 3.18.1**), incurred in securing indemnity and hold harmless from Contractor.

§ 3.18.3 The indemnification provisions contained in this **§ 3.18** shall survive the completion or termination of the Contract.

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.

§ 4.1.2 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 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without the prior written consent of the Owner.

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner;[1] to become generally familiar with the progress and quality of the portion of the Work completed, (2) endeavor to guard the Owner against defects and deficiencies in the Work, and (3) 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

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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.

(Paragraph deleted)

§ 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 Contractors in accordance with the latest approved 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, charge of, or responsibility for, the 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, 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. The Contractor shall endeavor to communicate with the Owner 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.

§ 4.2.8 The Owner, 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. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the 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, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with

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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.

§ 4.2.11 The Owner may authorize the Architect tol 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.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and 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 Construction Manager and 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 Construction Manager and Architect's review shall not constitute approval of safety precautions or 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.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives. and no Change Order or Construction Change Directive shall be effective until approved by Owner in writing, it being agreed that the term "Change Order" shall be deemed to include only those instruments which have been approved in writing by Owner.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7. 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.

§ 4.2.15 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.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or 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.

§ 4.2.17 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.

§ 4.2.18 If so directed, 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.

§ 4.2.19 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. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show

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partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith and in the absence of negligence.

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

§ 4.2.21 If so directed,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, through 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.

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 and/or supply materials for the Project.. 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 of the Owner or subcontractors of other Multiple Prime Contractors of the Owner. Each Subcontractor agreement and/or purchase order between Contractor and Subcontractor may be referred to as a "Subcontract".

§ 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, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review.

§ 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 or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

(Paragraphs deleted)

§ 5.3.1 Contractor shall promptly (i.e. within twenty-four [24] hours) provide notice to Owner, through the Construction Manager, of its receipt of any Subcontractor notice of default under any Subcontract.

§ 5.3.2 Without limitation to other requirements in the Agreement and the Contract Documents relating to Subcontracts, all Subcontracts shall be in writing and shall comply with the following:

.1 All Subcontracts shall require that, in the event of any default by the Contractor under any Subcontract and the Contractor's failure to cure such default within the applicable cure period, Owner shall have the right, at its sole option, to cure such default under the Subcontract. In addition, each Subcontract

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shall by its terms be conditionally assigned by the Contractor to the Owner, and only for those Subcontracts which the Owner accepts by notifying the Subcontractor and Contractor in writing, and assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

.2 Contractor shall require each Subcontractor, to the extent of the Work to be performed by such Subcontractor, be bound, without limitation, to Contractor by the terms and conditions no less stricter than of the Contract Documents, and, without limitation, to assume toward Contractor all of the obligations and responsibilities which are no less stricter than the Contractor, by the Contract Documents assumes towards the Owner.

.3 Each Subcontract shall include the Owner as an indemnified party and nothing in the Contract Documents shall limit Owner's direct right to enforce the indemnity provisions of each Subcontract.

.4 Each Subcontract shall include a provision that there is an express understanding and agreement by the Subcontractor that the Owner shall be an express intended third party beneficiary of each Subcontract and nothing in the Contract Documents or the Subcontract shall limit the Owner's direct right to enforce the provisions of the Subcontracts.

§ 5.3.3 Contractor agrees to observe all of Contractor's duties and obligations under any Subcontract and not to terminate any Subcontract without first advising Owner, through the Construction Manager.

§ 5.3.4 Immediately upon execution, Contractor shall forward to the Construction Manager one (1) executed copy of each and every Subcontract with each Subcontractor. Failure of Construction Manager or Owner to demand such Subcontract(s) or demand full compliance with the requirements herein, or failure to identify a deficiency from documents provided to Owner pursuant to this Section shall not be construed as a waiver of the Contractor's obligations hereunder.

§ 5.3.5 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.

§ 5.3.6 Subcontractual Relations

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 the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract 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.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract 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 for cause or for convenience pursuant to Section 14.2 and only for those subcontracts 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.

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When the Owner accepts the assignment of a subcontract, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the Subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

§ 5.4.3 The Owner may, at its sole discretion, furnish to any Subcontractor or supplier information regarding the Contractor's Applications for Payment and the amounts actually paid by the Owner to the Contractor on account of Work done by such Subcontractor or for materials furnished by such supplier.

§ 5.4.4 If the Owner fails to approve an Application for Payment for a cause which the Owner, determines is the fault of the Contractor and not the fault of a particular Subcontractor, or if the Contractor fails to make a payment, which is properly due to a particular Subcontractor, the Owner may pay such Subcontractor directly, less the amount to be retained under its subcontract. Owner shall not exercise its rights to make payment directly to Subcontractor, if the Owner determines that Contractor's withholding of payment is warranted and in the best interest of the Project. Any amount so paid by the Owner shall be credited against the Contract Sum; however, if the Contractor reasonably disputes any payments to any Subcontractor or supplier, the Owner shall withhold such payments from those funds remaining to be paid until the disputed claim between the Contractor and the Subcontractor or supplier is resolved, provided that the withholding of such funds does not adversely affect the completion of the Work in a timely manner.

§ 5.4.5 The Owner shall have no obligation to pay, or to see to the payment of any monies to any Subcontractor. Nothing contained in Article 5 (or elsewhere in the Contract Documents) shall be deemed to create any contractual relationship between the Owner and any Subcontractor. Subcontractor shall not have any claim as of a third party beneficiary or otherwise against the Owner by virtue of any provisions hereof.

§ 5.4.6 The Contractor shall promptly advise the Owner of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

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, and with Separate Contractors retained under Conditions of the Contract similar to those of this Contract, including those provisions of the Conditions of the Contract 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.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other 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.

§ 6.2.2 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

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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.

§ 6.2.3 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. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 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.

§ 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.

§ 6.3 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 This Contract is entered into with the understanding that Contractor shall furnish, and the Stipulated Sum includes, all items required for proper completion of the Work as set forth in the Contract Documents or reasonably inferable therefrom, without adjustment to the Stipulated Sum. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement between the Owner and Contractor; a Construction Change Directive requires agreement by the Owner and may or may not be agreed to by the Contractor.A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor.. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 It is understood, that without limitation, **§ 15.1** shall apply to any Claim by Contractor for an increase in the Stipulated Sum and/or Contract Time relating to any Work that it believes is a change in the Work and/or Work not included in the Drawings and Specifications upon which the is based or for an extension of time for a delay that is excusable to Contractor pursuant to the Contract Documents. Contractor shall provide Owner with written notice of such Claim within the timeframe set forth therein. Failure to provide such required notice within the required timeframe shall act as a waiver of such Claim.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager 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

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.3 The extent of the adjustment, if any, in the Contract Time.

It is expressly agreed that the term Change Order as used in the Contract Documents shall be deemed to include only those written instruments that have been approved and signed by Owner.
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§ 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 and , Construction Manager, 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.

§ 7.3.3 If the Construction Change Directive provides 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;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.4.

§ 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 the Agreement but not to exceed ten (10%) percent, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, 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 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the

(Paragraphs deleted)

change

(Paragraph deleted)

§ 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 the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 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 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead

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and profit (not to exceed ten (10%) percent shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 9 Any refusal by the Contractor to commence or perform disputed Change Order Work as directed by Owner, shall constitute a default hereunder. The Contract Sum and/or the Contract Time may be changed only by an Owner approved and signed Change Order.

§ 7.3.10 A Change Order signed by the Contractor indicates its agreement therewith, including the adjustment in the Contract Sum and/or Contract Time, if any.

§ 7.4 Minor Changes in the Work
[Intentionally omitted]

§ 7.5 BACKUP FOR CHANGE ORDERS, COST ESTIMATES AND CHANGE ORDER REQUESTS
§ 7.5.1 Cost Proposal. Any request for an increase in the Contract Sum submitted by or on behalf of the Contractor in connection with changes in the Work shall be itemized for the various components of Work and segregated by labor, material and equipment. The Contractor will furnish its itemized cost proposal and the similarly detailed cost estimates from Subcontractors.

§ 7.5.2 Time and Material. Should the Owner elect, in its sole discretion, to compensate the Contractor for the change in the Work on a time and materials basis, the Owner shall so notify the Contractor thereof in writing, through the Construction Manager, and the Contractor shall provide to the Owner, through the Construction Manager, such records and supporting documents to evidence the actual cost of the Work performed as reasonably required by the Owner.

§ 7.5.3 Unit Prices. To the extent that the Change Order Work is subject to Unit Prices, the Contractor's cost proposal for the Change Order Work shall itemize the quantities of each item of Work for which there is an applicable Unit Price

§ 7.6 PRIOR APPROVAL REQUIRED FOR INCREASES IN COMPENSATION OR EXTENSION OF TIME
Any changes in the Work undertaken without the Owner's prior authorization will not be recognized as a basis for an increase in the Contract Sum or an extension of the Contract Time. If the Contractor believes that any instructions or orders, whether oral, written, by drawings, or otherwise, constitute a change in the Work pursuant to which the Contractor would be entitled to an increase in the Contract Sum or an extension of the Contract Time, the Contractor shall promptly so notify the Owner in writing, through the Construction Manager, prior to proceeding with the Work which writing shall describe the basis for Contractor's position. Upon receipt of such notice the Owner, through the Construction Manager, shall either instruct the Contractor to proceed with the Work in question on the basis of a Construction Change Directive (or, if agreement is reached on the terms thereof, pursuant to a properly executed Change Order) or the Owner may instruct the Contractor to suspend that portion of the Work pending investigation of the Contractor's claim. The Contractor shall not be entitled to additional compensation or an extension of time unless the Contractor has so notified the Owner before proceeding.

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 the Contractor to achieve Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect ,as approved by the Owner and Construction Manager, in accordance with the Contract Documents and is otherwise defined in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 Progress and Completion

§ 8.2.1 The Contractor shall prepare the "Schedule" for the full construction and completion of all Work of the Project, including, but not limited to, containing details of construction sequences and timing, scheduling of purchase orders and deliveries of materials and equipment, and a schedule for preparation and processing of Shop Drawings, Samples and Product Data. The Schedule shall be subject to the Construction Manager's and Architect's review and the Owner's acceptance and will be the binding schedule for the Contractor's performance of its duties under this Contract subject only to changes resulting from a properly authorized Change Order signed by Owner, but, only if and to the extent such Change Order (a) is a scope Change Order proven to the reasonable satisfaction of Owner to demonstrably affect the Critical Path of the Schedule, or (b) is issued in response to a proper Claim for extension of time for the Required Substantial Completion Date for a delay that is excusable to Contractor under the Contract Documents, but, only to the extent that such excusable delay is proven to the satisfaction of Owner, in its discretion, to demonstrably impact the Critical Path of the Schedule (collectively "Critical Path Changes"). After approval of the initial Schedule, the Contractor shall prepare on a monthly basis, or more often as the Construction Manager may reasonably require, an updated Schedule that shall document the current status of the Work. The updated Schedule shall be subject to the Owner's approval but shall not alter the Contractor's obligation to meet the initial Schedule (as modified only by Critical Path Changes in properly authorized Change Orders signed by Owner). In addition, the Contractor shall prepare and keep current, for the Owner's and Construction Manager's approval, a schedule of submittals which is coordinated with the Schedule and allows the Construction Manager and Architect reasonable time to review submittals.

8.2.1.1 The Contractor shall perform the Work in accordance with the Schedule approved by Owner, as may be updated. Unless otherwise agreed by Owner, Contractor shall use the Critical Path Method of scheduling. It is agreed that time is of the essence in the performance of the Contract.

§ 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.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. If the Owner, through the Construction Manager, determines that the Contractor is not maintaining the pace of the Work in accordance with the Schedule or otherwise consistent with the Contract Time and such delays are not justified as set forth in **§ 8.3**, then the Owner may require the Contractor to undertake a time recovery plan (including more personnel, overtime and/or double shifts) at the Contractor's sole expense, to reasonably assure completion of the Work within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If, through no fault of any of the Contractor or Subcontractor(s), the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work by the Owner, or by industry-wide labor disputes, fire, unusual and unforeseen delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, if applicable, or by other causes that the Owner, based on the recommendation of the Construction Manager, determines may justify delay (the foregoing, collectively, "Excusable Delay") and provided such Excusable Delay delays the critical path of the Work, the Contract Time shall be extended by Change Order for such reasonable time as the Construction Manager and/or Architect may determine.

§ 8.3.1.1 In order for the Owner to properly investigate a Claim for Excusable Delay and mitigate the effects thereof, TIME IS EXPRESSLY OF THE ESSENCE FOR Contractor to provide written notice to Owner of any Claim relating to an Excusable Delay, and it is a condition precedent to Contractor's ability to pursue such Claim that the written notice of Claim shall: (a) be delivered to Owner, through the Construction Manager, within five (5) days after Contractor knew or should have known of the cause of the Excusable Delay; (b) state the basis for the Claim for Excusable Delay; (c) include demonstrable proof that the Excusable Delay affects the Critical Path of the Schedule; and (d) suggest strategies to the Construction Manager to mitigate the effect of any such delay including without limitation overtime, re-sequencing and other remedial methods. If Contractor does not provide written notice to Owner, through the Construction Manager, within the time required herein and otherwise in conformance with the

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requirements of such written notice, Contractor shall be deemed to have waived such Claim and shall not be entitled to make any Claim for any remedies for such Excusable Delay, including Contract Time extension.

§8.3.1.2 To the fullest extent permitted by law, should Contractor be entitled to an extension of time for an Excusable Delay pursuant to the terms and conditions above and elsewhere in the Contract, Contractor expressly agrees not to make, and hereby waives, any Claim for costs and damages, including, but not limited to, those resulting from increased supervision, labor or material costs, on account of any such Excusable Delay, and agrees that, except as provided herein, the sole right and remedy therefore shall be an extension of time.

§ 8.3.2 No Damage for Delay. The Owner shall not be liable to the Contractor and/or Subcontractor(s) for Claims or damages of any nature caused by or arising out of delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the procedures set forth in this Contract. 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; directions given or not given by the Construction Manager or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or review of shop drawings and requests for instruction(s); or, on account of any delay, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect, or any other 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.

(Paragraph deleted)
§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

It is expressly understood that notwithstanding **§ 8.3.1** and **§ 8.3.2** above, that no such Subcontractor shall be entitled to make any Claims for additional compensation, costs or damages against the Contractor (nor may the Contractor assert against Owner and/or Construction Manager such Claims as pass-through claims of Subcontractor or otherwise). Unless agreed by Owner in writing, Contractor shall endeavor to include in every Subcontract a 'No-Damage-For-Delay' provision in a form reasonably approved by the Owner.

§ 8.4 ACCELERATION
§ 8.4.1 Acceleration Due To Contractor Delay - Extraordinary Measures. In addition to any other rights granted to Owner under the Contract Documents, in the event the Owner and/or Construction Manager reasonably determines that the performance of the Work, relative to the required Substantial Completion Dates and Final Completion date and/or the Project Schedule has not progressed or reached the level of completion required by the Contract Documents, and such delayed performance was not caused by an Excusable Delay subject to an appropriate time extension pursuant to the Agreement, the Owner, through the Construction Manager, shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction of the Work, including, but not limited to, acceleration of the Work by means of overtime, additional crews or additional shifts, or additional equipment or facilities, or re-sequencing of the Work ("Extraordinary Measures"). The Owners right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Schedule relating to delayed performance for which the Contractor has not developed alternative recovery plans and schedules acceptable to the Owner. All such Extraordinary Measures shall be at no cost to the Owner and the Contractor shall not be entitled to an adjustment to the Contract Sum. Contractor shall perform such Extraordinary Measures until the progress of the Work complies with the stage of completion required by the Schedule. In the event of any acceleration requested pursuant to this **§ 8.4.1**, Contractor shall promptly provide a recovery plan and schedule acceptable to the Owner including Contractor's recommendations for the most effective and economical acceleration.

§ 8.4.1.1 The Owner may exercise the rights furnished the Owner under or pursuant to **§ 8.4.1** as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with the Required Substantial Completion Dates and Final Completion date set forth in the Schedule.

§ 8.4.2 Any rights conferred on the Owner pursuant to **§ 8.4.1** or in any other portion of the Contract Documents shall neither require Owner to exercise such rights for the benefit of the Contractor, nor shall they make Owner responsible in any way whatsoever for the Contractor's completion of the Work of the Project in conformance with the Schedule.

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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.

§ 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

The Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. 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 be prepared by the Contractor in such a manner that each major item of the Work is shown as separate line item on AIA Document G703 ("Application and Certificate for Payment, Continuation Sheet"), or other form acceptable to the Construction Manager. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 The Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, , for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

(Paragraph deleted)

§ 9.3.1.2 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 supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 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 site for subsequent incorporation in the Work. If approved in advance 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, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 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;(i) 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, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work; (ii) all Subcontractors, material suppliers, or other persons or entities performing and having provided labor, materials and equipment relating to the Work have been paid; and (iii) Contractor knows of no existing or threatened claims by any party against the Owner or the Project and/or the Project funds.

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§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, along with all Supporting Documentation (as required by the Agreement and Owner) 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 days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a 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 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 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 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 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 or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications 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, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project 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, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, 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 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 construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to

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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 or Project 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 9.4.3 and 9.4.4 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 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner,as approved by the Owner, or in an amount determined by the Owne The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project 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 or material not remedied;

.2 unsatisfactory or disputed progress;

r;

.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, including collectively bargained fringe benefit contributions, payroll taxes and insurance, materials, equipment damage to the Owner, or reasonable evidence that the Contract cannot be completed for the unpaid balance of the Contract Sum; ormaterials or equipment;

or

.4 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either partiy disputes the Architect's decision regariding a Certificate for Payment under 9.5.1, in whole or in part, that party may submit a Claim in aacordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner may in its sole judgment, notwithstanding that a Certificate for Payment may have been issued by the Architect, withhold any payment or portion thereof from the Contractor in the event that any of the conditions listed in **§ 9.5.1** exists, provided that the amount withheld shall not exceed a reasonable estimate of the direct costs which the Owner has incurred or may incur as a result of such condition. When such grounds for non-payment are removed, payment shall be made in the amounts withheld on account thereof. The Owner shall not be deemed to be in breach of the Contract for the withholding any payments pursuant to this **§ 9.5.2** or any other provisions of this General Conditions.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue a t to the Subcontractor or supplier 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 Contractor , the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. in compliance with applicable law concerning the prompt payment of Subcontractors, and in no event more than se,en (7) days after receipt of payment from Owner The

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Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. . Should the Contractor fail to make such payment to each Subcontractor, or any portion thereof, within such seven (7) days, Contractor shall immediately return such payment or portion thereof to Owner or, if such payment is not made solely because a bona-fide dispute exists between the Contractor and Subcontractor, such sum shall be paid to Contractor's attorney to be held in escrow pending the resolution of the dispute, and Owner shall concurrently with such deposit and any disbursal thereof be provided with written notice thereof.

§ 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 suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to 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 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within ftwenty-one (21) days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within thirty (30) days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon thirty (30) additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's actual costs of shutdown, delay and start-up.

§ 9.7.2 Notwithstanding an thing to the contrary contained in the Contract Documents, if the Owner withholds any payment from the Contractor in good faith with reasonable cause and in accordance with any provision of this General Conditions, then the Contractor shall nevertheless continue to prosecute the Work expeditiously, provided that the Owner immediately notifies the Contractor that it intends to withhold such payment and states the reasons therefor, and the Owner affords the Contractor reasonable opportunity to remedy or cure the condition causing the Owner to withhold such payments.

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§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work shall have been completed and all systems included in the Work shall be operational in accordance with the Contract Documents, and the premises may be occupied by the Owner to the reasonable exclusion of Contractor with only minor items remaining and the Owner can begin its complete use of the Project for its intended use. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be complete within thirty (30) consecutive calendar days following the Date of Substantial Completion.

§ 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 of items to be completed or corrected prior to final payment (the "Punch-List"). Failure to include an item on such Punch-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 Punch-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 Punch List, which is not sufficiently complete in accordance with 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 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.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, 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; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be net of an amount equal to 200% of the value of all Punchlist items which amount will be held by the Owner until final completion of the Project in accordance with the requirements of the Contract Documents and consistent with the provisions of New York State General Municipal Law §106-b.

§ 9.8.6 Following the issuance of a Certificate of Substantial Completion of the Project, Contractor shall coordinate and ensure the correction and completion of all Work and make recommendations to the Owner and Architect when the Work of the Project is ready for final inspection. Contractor shall assist the Owner and the Architect in conducting final inspections. Contractor shall secure from Subcontractors and transmit to Owner required guarantees, affidavits, releases and waivers. Contractor shall deliver all keys, manuals, record drawings and maintenance stocks to Owner.

§ 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 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. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the

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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.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work has passed all inspections by all applicable local and municipal building and zoning authorities, and (ii) is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Final Completion shall occur on the date the Contract has been fully performed, all the Work has been completed and a final Certificate for Payment approved by the Construction Manager has been issued to the Owner. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will 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 y issue a final Certificate for Payment or Project Certificate for Payment to be reviewed and accepted by the owner 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.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) 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, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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. 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees,(7) all operating, servicing, maintenance and cleaning instructions, parts list and special tools for mechanical and electrical work incorporated into the Project, and Drawings and Specifications marked-up to show 'as-built' conditions, in such form subject to Owner's approval, (8) all permits and approvals, and guarantees and warranties, including without limitation, manufacturers' warranties and certificates of inspections, (along with any assignments to Owner as necessary) in form and substance satisfactory to Owner, (9) evidence of completion and submission to all necessary parties of all documents, information and sign-off's required by Owner, and (10) evidence that Contractor and/or Contractor's Subcontractors have satisfactorily instructed appropriate Owner's personnel in the operation and maintenance of all systems and equipment

§ 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

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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
(Paragraphs deleted)
Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.5 Neither the issuance of a Certificate for Payment nor any payment (whether progress payment, payment upon substantial completion or final payment) nor any partial or total acceptance or occupancy of the Project by the Owner (either in writing or de facto) shall constitute approval of any costs included in any Application for Payment or an acceptance of any Work not in accordance with the Contract Documents nor shall any inspection or test by the Owner be an acceptance of any Work not in accordance with the Contract Documents.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, 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.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, 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** 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; and
- **.4** construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 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.

§ 10.2.3 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. . Contractor, shall cause to be performed any work and furnish and install any materials and equipment which Contractor deems reasonably necessary to prevent threatened damage, injury or loss and shall otherwise protect all finished and unfinished Work and all materials at the Project site, all adjacent property, and all plant, equipment and other appliances at the Project site from rain, water, frost and the elements and from other kinds of damage which may be caused in any manner whatsoever, and Contractor shall be entirely responsible for any loss or damage done to the Work, materials, plant, equipment and other appliances in any manner aforementioned, excepting damage caused by Owner or its separate contractors or by causes outside the Contractor's control, unless such damage would not have occurred if the Work had been protected in accordance with good construction practices at projects of similar size, complexity and location. Contractor shall notify Owner of an emergency as soon as practicable but shall not wait for instructions before proceeding.

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§ 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 and shall give the Owner reasonable notice.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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.

§ 10.2.6 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 permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 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 regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, the Contractor shall immediately report the condition to the Owner, Construction Manager and Architect in writing and take reasonable precautions 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). If such reasonable precautions will be inadequate to so prevent foreseeable bodily injury and death, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the 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 or otherwise. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. 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 by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.2.1 In no event shall the Owner have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor or any materialman or supplier, or any entity for whom any of them is responsible. The Contractor agrees not to use any fill or other materials to be incorporated into the Work, which are hazardous, toxic or comprised of any items that are hazardous or toxic.

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§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents 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 such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous 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 hazardous 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 reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, its agents, representative and employees 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

§ 10.3.7 If, without negligence 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 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.

§ 10.4 Emergencies

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. . The Contractor shall promptly notify insurers as applicable, and the Owner of the nature of the emergency. Immediately thereafter, the Contractor shall submit to the Owner a written report including description of circumstances of the emergency and details of actions taken.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall obtain, pay for and keep in full force and effect during the entire term of this Contract, and during the performance, final completion and acceptance of any Work, and after the term of this Contract (as may be specified herein) insurance, in a company or companies lawfully licensed to do business in the State of New York, as designated by this Article 11 and any other insurance required by applicable law, regulations, or orders of state, municipality or other entity having jurisdiction over the Work or the Project. Contractor shall not take any action, or omit to take any action that would suspend or invalidate any of the required coverages during the time period such coverages are required to be in effect.

§ 11.1.1.1 Workers' Compensation. and any other federal and/or state coverages as appropriate, including but not limited to: Occupational Disease Benefits, Voluntary Compensation, and Disability Benefits, for not less than the statutory requirements, and if applicable an "Other States Endorsement"; and

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Employer's Liability Insurance with limits not less than the statutory requirements or $1,000,000 (each accident), $1,000,000 (disease policy limit), and $1,000,000 (disease, each employee), whichever is greater. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable.

§ 11.1.1.2 Commercial General Liability Insurance is to be provided under the Insurance Service Office's (ISO) most current form, on a project specific basis, with limits not less than the following required limits:

Each Occurrence:	$1,000,000
General Aggregate (per project):	$2,000,000
Products and Completed/Operations:	$2,000,000
Personal & Advertising Injury:	$1,000,000
Fire Damage (any one fire):	$ 100,000
Medical Expense (any one person):	$ 10,000

Such insurance shall include the following coverages:

(i) claims for damages because of bodily injury, occupational sickness or disease, or death;

(ii) claims for damages insured by usual personal injury liability coverage;

(iii) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

(iv) premises operations;

(v) product liability and completed operations, and the policy shall specifically include coverage for two (2) years of extended completed operations coverage, which will commence immediately following the expiration date of the Commercial General Liability policy;

(vi) owner's protective;

(vii) contractors protective;

(viii) contractual liability covering liabilities assumed under the Contract (including the tort liability of another assumed in a contract), and including, coverage for claims arising out of construction or demolition operations when working within 50 feet of railroad track;

(ix) personal injury and advertising injury liability;

(x) extended bodily injury coverage with respect to bodily injury resulting from the use of reasonable force to protect persons or property;

(xi) medical payments coverage;

(xii) broad form property damage liability coverage, including coverage for completed operations;

(xiii) explosion, collapse, and underground property damage (XCU);

(xiv) construction means and methods;

(xv) independent contractors;

(xvi) Owner and others' identified herein as additional insured to be specifically evidenced as additional insureds via ISO Endorsements GC 2010 and CG 2037.

Owners Contractors Protective (OCP) Insurance

For projects less than or equal to $1,000,000 and/or work on 1 story (10 feet) only; $1,000,000 per occurrence, $2,000,000 aggregate with the District/BOCES as the Named Insured.
For projects greater than $1,000,000 and/or work over 1 story (10 feet); $2,000,000 per occurrence, $4,000,000 aggregate with the District/BOCES as the Named Insured.
The OCP Policy must be with a NYS licensed and admitted carrier.
The District/BOCES will be the Named Insured on OCP Policies. There will be no Additional Insureds on any OCP Policies.

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§11.1.1.3 Comprehensive Auto Liability Insurance, including uninsured/underinsured and medical payment protection, and including all owned, non-owned and hired autos, with a limit of liability of not less than $1,000,000 each occurrence (combined single limit for personal injury, including bodily injury or death, and property damage).

§11.1.1.4 Umbrella/Excess Policy, providing excess coverage in excess of the limits for the insurance coverages required by Sections 11.1.1.1, 11.1.1.2, and 11.1.1.3 above, with such excess/umbrella coverage being at least as broad as each and every one of the underlying policies), with the provision that coverage shall extend for a period of at least two (2) years from the date of final completion and acceptance by Owner of all Work; with a minimum limit not less than $10,000,000 per occurrence/annual general aggregate. In the event the underlying policies have different renewal dates, the Contractor shall ensure that the underlying policies are maintained for the term specified in this Contract. Subcontractors shall be held to the same coverage requirement. Failure by the contractor to secure such insurance shall be deemed to be a material breach of contract.

§ 11.1.2 All insurance shall be written on an occurrence basis. A copy of the additional insured endorsement shall be attached.

§ 11.1.3 Contractor's insurance requirements shall be provided by an insurance carrier licensed to do business in the State of New York and have an A.M. Best Rating of A- or better as determined in the most recent A.M. Best Publication, or as may otherwise be agreed by Owner.

§ 11.1.4 Insurance coverage to be provided by the Contractor shall state that the Contractor's coverage shall be primary and non-contributing to any insurances (or self-insurance), including any deductible, maintained by, or provided to Owner or the other Additional Insureds; and shall contain a Waiver of Subrogation in favor of Owner and the other Additional Insureds, so that in no event shall the insurance carriers have any right of recovery against the Owner, the other Additional Insureds, or the agents or employees or either of them; and shall contain a separation of insured provision (severability of interest clause). If the Owner or another Additional Insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis.

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

§ 11.1.6 The Contractor shall require all Subcontractors to carry the same insurance coverages and limits of liability as set forth herein and adjusted to the nature of Subcontractors' operations and submit same to the Owner through the Construction Manager for approval prior to start of any Work. In the event Contractor fails to obtain the required certificates of insurance from Subcontractor and prove them to Construction Manager and a claim is made or suffered, the Contractor shall, to the fullest extent permitted by law, indemnify, defend, and hold harmless the Owner and the Additional Insureds from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract Documents and shall survive the term or earlier termination of the Contract.

§ 11.1.7 Environmental Impairment Liability (Pollution Insurance) (EIL): All Contractors and Subcontractors involved with the removal and/or abatement of pollutants (including but not limited to asbestos abatement contractors, lead abatement contractors, roofing contractors, tank removal contractors) are required to maintain a minimum of $1,000,000 per occurrence and $2,000,000 in the aggregate. Owner and all other parties required by this Contract to be Additional Insureds and all others identified by Owner as such, shall be included as Additional Insured son any EIL policy on a primary and non-contributing basis.

§ 11.1.8 The Contractor assumes responsibility for all injury or destruction of the Contractor's and Subcontractors' materials, tools, machinery, equipment, appliances, shoring, scaffolding, and personal property of Contractor's and Subcontractors' employees from whatever cause arises. Any policy of insurance secured covering the Contractor's or Subcontractors' property leased or hired by them and any policy of insurance covering the Contractor or Subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.

§ 11.1.9 Additional Insured/Certificate Holder. The Contractor shall cause the commercial liability and other

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coverage required by the Contract to include the following as Additional Insureds:

(i) Chappaqua Central School District;

(ii) Members of the Board of Education, officers and employees, of the Chappaqua Central School District;

(iii) The Construction Manager

(iv) The Architect ; and

Contractor shall also add any other entities and/or individuals as may be required by Owner as Additional Insured.

The certificate holder shall be Chappaqua Central School District unless Owner requires otherwise.

Contractor shall provide an Additional Insured endorsement that expressly names each of the above identified Additional Insureds (non-blanket) and shall ensure that the endorsement does not include language that requires an Additional Insured to have a written contract with the named insured for coverage to apply.

Additional insured status shall be provided by standard or other endorsements that extend coverage to the District for ongoing operations (CG 20 38) and products and completed operations (CG 20 37). The decision to accept an endorsement rest solely with the District. A completed copy of the endorsements must be attached to the Certificate of Insurance

§ 11.1.10 Certificates of insurance acceptable to the Construction Manager and Owner shall be provided to the Construction Manager and filed with the Owner prior to commencement of the Work. A fully completed New York Construction Certificate of Liability Insurance Addendum (ACORD 855 2014/15) must be included with the certificates of insurance. The certificates and the insurance policies shall contain a provision that coverages afforded under the policies will not be allowed to be materially changed or canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner via Certified/Registered Mail. If any of the foregoing insurance coverages are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

§ 11.1.11 The Contractor acknowledges that its failure to obtain or keep current the required insurance coverage shall constitute a material breach of contract and subjects the Contractor to liability for damages the Owner (or others, including without limitation the other Additional Insured) sustains as a result of such breach. In addition, the Contractor shall be responsible to the fullest extent permitted by law for the indemnification to the Owner and all Additional Insured of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorneys' fees (and this indemnification obligation shall survive the term or earlier termination of the Contract).

§ 11.1.12 The amount of insurance required by the Contract shall not be construed to be a limitation of the liability of on the part of the Contractor or any of its Subcontractors.

§ 11.1.13 No act or omission of any insurance agent, broker, or insurance company representative shall relieve Contractor of any of its obligations under this Contract.

§ 11.1.14 Notwithstanding anything in Section 11.3 and its subsections to the contrary, 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 on a full replacement cost basis. The Contractor is responsible for all deductible amounts.

§ 11.2 Owner's Insurance

Builder's Risk *Will be purchased and maintained by the Owner to include interest of the Owner, Contractor, Subcontractors and Sub subcontractors jointly. The limit will reflect the total completed value (all material and labor costs) and provide coverage for fire, lightning, explosion, extended coverage, vandalism, malicious mischief, windstorm, hail and/or flood. Coverage will remain in effect until the*

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Owner is the only entity that has an insurable interest in the property.

(Paragraphs deleted)

§ 11.3 Waivers of Subrogation

Contractor's Bonds *The Contractor shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum as security for the payment of all persons performing labor on the Project under this Contract. Bonds shall be issued by a bonding company with an A. M. Best rating of A- or better as determined in the most recent A.M. Best Publication, and licensed in the State of New York, on the form(s) included in the Contract Documents. The sufficiency of the bonds is subject to the approval of the Owner, and bonds which are deemed insufficient by the Owner may be rejected.*

§ 11.3.1 *The Contractor shall deliver the required bonds to the Owner within ten (10) days of issue date of Notice of Award of Contract. No work shall be performed by the Contractor until such bonds have been reviewed and acknowledged.*

§ 11.3.2 *The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.*

(Paragraphs deleted)

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 that the Construction Manager or Architect has not specifically requested to examine 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, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before 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 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, 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 at its sole expense 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 Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5. and Contractor shall be obligated to reimburse the Owner all costs incurred in relation to such correction.

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§ 12.2.2.2 The one-year period for correction of 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 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 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.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other 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.

§ 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 one-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.

§ 12.2.6 The corrective remedies set forth in **§ 12.2** are not exclusive and shall not deprive the Owner of any action, right or remedy otherwise available to it for breach of any of the provisions of the Contract Documents and for any damages suffered by Owner as a result of such defects in 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 appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the State of New York Any action arising out of or relating to the Contract or Project shall be brought exclusively in a court of competent jurisdiction in the State of New York

§ 13.1.1 Survival. All defense and indemnification obligations of Contractor, and all representations, warranties, covenants, and waivers contained in this Contract or made during the course of performance hereunder shall survive the making of the final payment and any termination of the Contract.

§ 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 similarly situated entity with demonstrated financial ability needed for the competition the Project if the entity agrees to assume the Owner's rights and obligations under the General Conditions. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.2.3 Written Notice

All notices given pursuant to the Contract Documents shall be in writing and shall be hand delivered or sent by overnight mail service, with an e-mail copy, to the respective representatives of the parties at the addresses set forth above or to such other addresses for which notice of change shall have been given. All notices shall be deemed to have been given on the date received.

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§ 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 at law and in equity.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing. . No provision contained in the Contract Documents shall create or give to third parties any claim or right of action against the Owner, except as specifically provided herein.

§ 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. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, 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 tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 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 and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements 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. . If the inspections and tests conducted under **§ 13.4.1** or this **§ 13.5.2** reveal failure in a portion of the Work, the Owner may order the inspection and testing, at the Contractor's expense, of any and all portions of the Work that are identical or similar to the failing portion.

§ 13.4.3 If 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.

§ 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.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located, pursuant to General Municipals law Section 3-a.

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§ 13.6 Liens. At all times, Contractor shall fully and promptly pay and discharge any and all commitments and claims and wholly defend, protect, indemnify and hold harmless Owner, and any lenders or investors, (and their respective officers, directors, agents, servants, employees, members, shareholders, parents, subsidiary and affiliate companies) (collectively the foregoing "Lien Indemnitees") from and against any and all mechanic's liens or claims by Contractor or Subcontractors or any others for whom Contractor is responsible in connection with supplies materials or services relating to the Project and against all damages, liability, cost and expense arising out of or related thereto (whether direct or consequential notwithstanding any provisions of the Contract to the contrary) and including all reasonable attorneys' fees and disbursements (including attorneys' fees relating to the enforcement of this provision, and any appeals, and in obtaining judgments and collection of such costs and expenses), that the Lien Indemnitees may suffer or incur as a result thereof, provided, however, that Contractor has been paid by Owner all undisputed sums properly due pursuant to the Contract Documents. In connection with the foregoing, all mechanic's liens filed by Contractor or Subcontractors or any others for whom Contractor is responsible (except where Owner has not paid the Contractor all undisputed sums properly due pursuant to the Contract Documents) shall be removed, discharged or bonded by Contractor within seven (7) days of notice from Owner. If Contractor fails to commence the process to discharge or remove any lien within seven (7) days after notice of the lien, and notify Owner thereof in writing that it is doing so, or if Contractor thereafter commences the same but fails to diligently prosecute and achieve such discharge or removal to the satisfaction of Owner in its sole discretion within the seven (7) days required for such, Owner shall, without limitation to Contractor's full defense and indemnification obligations under this **§ 13.7** have the right to remove, discharge or bond such lien and deduct the cost thereof (including the amount paid or bonded plus reasonable attorneys' fees, disbursements, and other necessary costs) from any payment due the Contractor. Rights under this **§ 1367** are in addition to any other rights available to the Lien Indemnitees under the Contract and/or law, and shall survive the term or earlier termination of the Contract.

§ 13.7 Standard of Care. Unless otherwise specified in the Contract Document, specifically including, but in no event limited to, the Drawings and Specifications, all materials shall be new and of good quality and the Contractor shall, requested by the Owner, furnish satisfactory evidence to the Owner as to transportation, services and all other things necessary to complete the Work in accordance with the intent of the Contract Documents, including all work expressly specified therein and reasonably inferable from the Contract Documents, except for only such items or work specifically stated in the Contract Documents not to be the obligation of the Contractor. Contractor represents and warrants to Owner that it has extensive experience in constructing projects similar to the Project that it is experienced with public schools in New York State and that it is familiar with and knowledgeable regarding the components that are properly and customarily included within such a project, including the requirements of state laws, local building codes, local building officials, manufacturers' recommendations, building standards, and trade practices as to the types and quantities of components, items, systems, materials, and methods of construction to be included in the Project, in order to produce a project that will operate with utility and efficiency; and the Work shall be performed by qualified, trained, experienced and competent personnel in a professional and workmanlike manner in accordance with (i) generally prevailing and accepted industry standards; (ii) all requirements of any warranties applicable to the Work; and (iii) all applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental authority relating to the Work and the safety of persons and their protection against injury. The Contractor represents and warrants to the Owner that it has experience in constructing projects similar to size, type, magnitude, location and class as the Project, and that it is familiar with and knowledgeable regarding the components that are properly and customarily included within such a project, including the requirements of state laws, local building codes, local building officials, manufacturers' recommendations, building standard and trade practices ("Good Building Practices") (collectively, the "Standard of Care"). The Contractor represents and warrants that all work, materials, equipment, labor and operations that are likely to be required for the Project will be in accordance with Good Building Practices and is included within the cost of the Project.

§ 13.8 The Contractor further represents and warrants that it has visited and examined the Project site, that it has examined all physical, legal, and other conditions affecting the Work and that it has become familiar with local conditions (including, but not limited to, layout, nature, surrounding areas, climatic conditions, anticipated labor supply and costs, availability and costs of materials, tools and equipment, etc.) under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 13.8.1 The Contractor has thoroughly reviewed and inspected all of the existing Contract Documents and all other information and documents provided by the Owner to the Contractor and the Contractor represents and warrants to the Owner that the Contractor has notified the Owner and Architect of any errors, discrepancies or missing information

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which the Contractor has identified prior to executing the Contract. Contractor acknowledges and warrants that it has examined all the Contract Documents, that they are suitable and sufficient to enable Contractor to complete the Work in a timely manner.

§ 13.9 PREVAILING WAGES: The wage rate which can be paid to workers employed in the performance of the Contract shall be no less than the rates of wages as promulgated by the Department of Labor and Industry of the State for the location and duration of this project.

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 30 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;

.3

(Paragraphs deleted)

§ 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, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work 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 seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.1.5 The notice of termination delivered pursuant to **§ 14.1.3** or **§ 14.1.4** must state with specificity the means by which the Owner may cure its nonperformance, and the Contractor shall not terminate the Contract if, within the applicable seven (7) day period, the Owner begins to take such curative measures.

§ 14.2 Termination by the Owner for Cause

(Paragraphs deleted)

§ 14.2.1 The Owner shall have the right to terminate the Contract, at any time, upon not less than seven (7) days written notice, all or any portion of the Work and/or phase of the Project to be performed hereunder by the Contractor for cause (provided the Contractor does not cure such default to the satisfaction of Owner, or if not curable within said seven (7) day period, commence and diligently prosecute such cure to satisfaction of the Owner), if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials or to otherwise prosecute the work promptly and diligently;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors or otherwise materially breaches its obligations under a subcontract with a Subcontractor;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 fails to comply with the directions, instructions and requirements of the Owner given pursuant to the terms of the Contract Documents;

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.5 fails to remove lien or other claim by Subcontractors against the Owner or the Owner's property or Project;

.6 has a voluntary or involuntary petition filed by it or against it in bankruptcy; or (ii) be adjudged a bankrupt; or (iii) has any or all of its assets or the business conducted by it taken by any trustee, receiver or other person pursuant to any judicial proceedings; or (iv) becomes insolvent; or (v) has a petition for a dissolution, reorganization or arrangement of its affairs filed by or against it; or (vi) makes a general assignment for the benefit of its creditors; or (vii) has a receiver or trustee in liquidation, whether temporary or permanent appointed for it or for any of its property;

.7 knowingly submits any document that is false or misleading; or

.8 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contrator's surety, if any, seven (7) days' written notice, terminate employment of the Contractor 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. 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.

§ 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.

§ 14.3 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.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. 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 Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.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; and

.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.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

(Paragraph deleted)

§ 15.1.2 Time Limits on Contractor's Claims/Notice of Claims

It is a condition precedent to Contractor's ability to pursue any Claim that written notice of the Claim by Contractor in strict compliance with the requirements of this Section 15.1.2 must be initiated by written notice to the Owner with a copy sent to the Construction Manager and Architect. within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later so that the Owner can properly investigate the Claim, TIME IS EXPRESSLY OF THE ESSENCE WITH RESPECT TO CONTRACTOR'S GIVING OF NOTICE OF CLAIM TO OWNER AS PROVIDED HEREIN AS A CONDITION PRECEDENT TO ITS ABILITY TO ASSERT OR OTHERWISE PURSUE ANY CLAIM. The notice of Claim shall set forth: (1) the reasons for which the Contractor believes additional compensation will or may be due or additional time should be granted; (2) the nature of the costs involved; (3) the Contractor's plan for mitigating such costs; (4) if ascertainable, the amount of the potential Claim. For any Claim initiated after the time limit set forth in this Section 15.1.2 or otherwise not in compliance with the information required by this Section 15.1.2, Contractor shall be deemed to have expressly waived any such Claim and shall forfeit any rights that it may have pursuant to this Contract or in law or equity to ever assert or otherwise pursue such Claim. The requirements of this Section are in addition to Contractor's obligation to strictly comply with New York State Education Law §3813.

§ 15.1.3 Continuing Contract Performance

§ 15.1.3.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker. It is understood
That a violation of this provision by Contractor shall cause irreparable harm to the Owner.

(Paragraph deleted)

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided in Section 15.1.2 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

(Paragraphs deleted)

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided herein shall be given as required by Article 8 hereinabove. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 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.

§ 15.1.5.3 Claims for increase in the Contract Time shall 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 may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

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§ 15.1.5.4 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 Waiver of Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude award of liquidated Delay Damages, when applicable, in accordance with the requirements of the Contract Documents.

(Paragraphs deleted)

§ 15.1.7

(Paragraphs deleted)

The Construction Manager, Architect and/or the Owner may, but are not obligated to, notify the Surety of the nature and/or estimated amount of any Claim that the Owner or others may have against Contractor. If such Claim relates to a possibility of a Contractor's default/termination, the Construction Manager, Architect, and/or Owner may, but are not obligated to notify the Surety and request the Surety's assistance in resolving the controversy.

§ 15.2 Initial Decision

§ 15.2.1 Claims, 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 excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and 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 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, 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 or to furnish additional supporting data, such party shall respond, within ten days after receipt of the 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 in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the

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reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect 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 mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim 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.
(Paragraphs deleted)

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NEW YORK STATE WAGE RATE SCHEDULES

1.1 GENERAL

A. The following minimum prevailing rate of wages, health and welfare and pension fund contributions are as determined by the Industrial Commissioner of the State of New York in accordance with the provisions of Section 220 of the Labor Law of New York State.

B. It shall be the sole responsibility of each Contractor to pay wages at least equal to current and future Wage Rate Schedules which are applicable to this project throughout the entire duration of the Contract without claiming extra costs.

C. Current Wage Rate Schedules are included herein. The Owner and the Architect do not warrant the accuracy or pertinency of the wage rates stated. The Contractor shall be solely responsible for verifying the accuracy of the current and future Prevailing Wage Schedule.

D. Prevailing Rate Case Number (PRC# 2023009303) has been assigned to the project. To access the PDF file of your schedule, click on the following link or copy and paste into your browser.

https://apps.labor.ny.gov/wpp/doFindProject.do

E. Notice of Award: Each Prime Contractor shall submit a notice of award of contract to the Department of Labor upon signing of contract. The above link for the PRC has a tab to submit such notice.

Prevailing Wage

· Wage Schedule · Submit Notice Of Award · Submit Notice Of Project Completion

PRC#: 2023009303
Type of Contracting Agency: Local School District

Acceptance Status: Accepted Article 8

Contracting Agency

Chappaqua Central Sch District
Josh Culwell-Block
Asst. Superintendent for Bus.
66 Roaring Brook Road
Chappaqua NY 10514

(914) 238-7200
joblock@chappaquaschools.org

Send Reply To

Erik Kaeyer
Principal, AIA
285 Main Street
Mount Kisco NY 1054 - 9

(914) 666 -5900
jmiano@kgdarchitects.com

Project Information

Project Title	District-Wide Capital Improvem
Description of Work	HS: New athletics pavilion, br. add, partial roof replmt, paving, HVAC upgrades, fire alarm upgrades,&lighting upgrades.MS: Partial roof replmt, HVAC upgrades,& play field renovation. ES: Roof replmt, paving, HVAC upgrades & playground resurfacing
Contract Id No.	2023-1028
Project Locations(s)	Multiple
Route No / Street Address	
Village / City	Chappaqua
Town	
State / Zip	NY
Nature of Project	Other Reconstruction, Maintenance, Repair or Alteration
Approximate Bid Date	01/05/2024
Checked Occupation(s)	Construction (Building, Heavy & Highway, Sewer, Water, Tunnel)

Applicable Counties

Westchester

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Intent of the Contract Documents
4. Type of contract
5. Scope of Work – separate Prime Contracts
6. Work schedule and phasing
7. Work under separate contracts
8. Coordination of Work of Separate Prime Contracts
9. Access to site.
10. Coordination with occupants.
11. Work restrictions.
12. Specification and drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: The project consists of District-Wide Capital Improvements - High School & Middle School HVAC Upgrades at the following three schools for the Chappaqua Central School District:
1. Horace Greeley High School located at 70 Roaring Brook Road, Chappaqua, NY 10514.
2. Seven Bridges Middle School located at 222 Seven Bridges Road, Chappaqua, NY 10514.
3. Robert E. Bell Middle School located at 50 Senter St., Chappaqua, NY 10514.

B. Owner: Chappaqua Central School District in Chappaqua, NY.

C. Architect: The Contract Documents were prepared for Project by KG+D Architects, PC.

D. Construction Manager: Empire Core has been engaged as Construction Manager for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and Contractor, according to a separate contract between Owner and Construction Manager.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

1. Robert E. Bell Middle School: HVAC upgrades to add air conditioning at Gym and Cafeteria.
2. Seven Bridges Middle School: HVAC upgrades to add air conditioning at Gym.
3. Horace Greeley High School:
   a. HVAC Upgrades: Add air conditioning at the L Building, the Cafeteria, and the Gym.
   b. Elecrical Upgrades: Electrical work associated with HVAC upgrades, and replace Boiler Room distribution board and damaged feeder cable to Gym Building.

B. Work in Existing Building(s) at Existing Site(s): Existing conditions are shown on the drawings to the best knowledge of the Architect. The Architect, however, cannot guarantee the correctness of the existing conditions shown and assumes no responsibility therefore. It shall be the responsibility of the Contractor to verify all existing conditions.

1. Contractor shall take all necessary field measurements prior to fabrication and installation of work and shall assume complete responsibility for accuracy of same.

1.4 INTENT OF THE CONTRACT DOCUMENTS

A. If, in the interpretation of Contract Documents, requirements within the Drawings and Specifications conflict, or it appears that the Drawings and Specifications are not in agreement, the Contractor shall provide (1) the greater quantity, where there is a discrepancy in quantity, and (2) the superior quality, where there is a discrepancy in quality. All discrepancies shall be brought to the attention of the Architect. The Architect’s decision on resolving the discrepancy shall be final.

1.5 TYPE OF CONTRACT

A. The Work of the project will be let in three (3) separate contracts; separate Prime Contracts will be awarded for the following categories of work:

1. Contract No. 1: General Construction Work.
2. Contract No. 2: HVAC Work
3. Contract No. 3: Electrical Work

B. Responsibilities assigned to each separate Prime Contractor and the scope of the Work included in each contract is clearly identified in the Specifications and Drawings.

C. One set of Documents is issued covering all contracts. Each Prime Contractor shall review all drawings and specifications for complete understanding and knowledge of the Work.

1.6 SCOPE OF WORK – SEPARATE PRIME CONTRACTS

A. Each Prime Contractor is responsible for all of Procurement and Contracting Requirements (Division 00), General Requirements (Division 01), and all work specifically indicated, including the following:

1. General Construction Work: Architectural, structural, civil and hazardous materials abatement drawings, and specifications contained in Division 02 through 14 and 31 through 32, except where specifically noted by others, and as specifically required to complete the work of the general construction.
2. HVAC Work: Mechanical drawings and specification sections in Division 23 and such work types, such as cutting and patching, as specifically required to complete the work of the HVAC installations
3. Electrical Work: Electrical drawings and specifications contained in Division 26, and such work types, such as cutting and patching, as specifically required to complete the work of the electrical installations

B. All Prime Contractors are responsible to provide a complete installation of their work with the exception of such work that is specifically indicated to be by another Contractor. Exceptions or clarifications are as follows:
1. Cutting and patching in the existing building generally will be by the trade needing that work. When mechanical or electrical work is above a ceiling, not being replaced by the GC, the Prime doing that work will be responsible for providing their own access and restoration.
2. Exceptions for cutting and patching at the existing building will be:
   a. The GC will be responsible for penetrations through the existing façade and roof.

3. All trades shall coordinate, schedule, and sequence work so no cutting and patching is required in any new slabs (or the trade failing to comply would be responsible).
4. Excavation for any sub grade mechanical / plumbing (within 5'-0" of the building) would be by the trade requiring same. (Outside of 5'-0", including any structures would be by the GC, who would provide their own excavation.)
5. Fire-safing / fire-stopping will be by the trade needing / installing that work.
6. All trades to provide access doors as required by their work, to be installed by the GC.

C. Refer to the Multiple Prime Contractor Coordination Chart attached to this section for additional scoping information for all Prime Contracts.

1.7 WORK SCHEDULE AND PHASING

A. The Work shall be substantially complete on or before the date(s) indicated in the Project Milestone Schedule attached to this Section. It is extremely important that the Owner resume its full use of the buildings and sites on the completion date(s) specified.

B. The Work shall be conducted in accordance with the logistics site plans for each of the schools, and the milestone schedules included in the contract documents.

C. Work may be commenced in the building and on the sites on the date(s) indicated in the Project Milestone Schedule attached to this Section.

1.8 WORK UNDER SEPARATE CONTRACTS

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

B. Concurrent Work: Owner has awarded separate contract(s) for the following construction operations at Project site(s). Those operations will be conducted simultaneously with Work under this Contract. Coordinate with these separate contractors as required.

1. High School: Reroofing work, tennis court lighting, paving work, construction of new athletic pavilion, reconstruction of pedestrian bridge and auditorium lighting.
2. Bell MS: Nothing
3. Seven Bridges MS: Baseball field work.

1.9 COORDINATION OF WORK OF SEPARATE PRIME CONTRACTS

A. Project Coordinator shall be responsible for coordination between the Separate Prime Contracts

1. Construction Manager shall act as Project Coordinator.

1.10 ACCESS TO SITE

A. Limits: Confine constructions operations to areas within contract limits indicated. Do not disturb portions of the building and site beyond the areas in which the Work is indicated. All areas of the building and site with the exception of the project area where the Work is being performed are off limits to Contractor and his employees.

1. Driveways, Walkways and Entrances: Keep driveways, loading areas**,** and entrances serving premises clear and available to Owner, Owner's employees, students, the public and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
c. Coordinate staging, parking and storage areas with the Construction Manager.

B. Damages: Promptly repair damages caused to adjacent facilities by work of the Contract to a good-as-new condition acceptable to the Owner.

C. Existing Facilities: The following facilities are specifically noted as not to be used by Contractor or his employees:

1. Toilet facilities.
2. Food service facilities, including kitchen and dining areas.
3. Parking lots (outside of the parking areas designated for Contractor's use).
4. Telephones.

D. Security: The Contractor and all employees of the contractor shall be subject to the security provisions required by the Owner. Such provisions shall include, but not be limited to, the following:

1. Contractor and all their employees shall use a single means of access and egress to the building, except in the case of emergency, as designated by the Construction Manager.
2. Photo identification badges shall be procured for all persons entering the Project building or site and shall be worn continuously while the person is in the building or on the site.
3. All persons entering the building or site shall be subject to the Owner's visitor management system, and may be subject to fingerprinting or other security-related screenings.
4. Contractor shall maintain a daily list of their personnel at the Project site.

1.11 COORDINATION WITH OCCUPANTS

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

1. Maintain access to existing adjacent occupied or used facilities. Do not close or obstruct adjacent drives, walkways, or other occupied or used facilities other than those obstructions currently indicated on the Contract Documents without written permission from Owner and approval of authorities having jurisdiction.
2. Occupancy level will be reduced during summer months when school is not in session.

B. Utility Shutdowns: Coordinate all utility shut downs and cross overs with the Construction Manager, schedule during off hours and non-occupied times only.

1. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations. Include planned shut-downs and interruptions in Construction Schedule.
2. Electrical and mechanical services to functioning spaces shall be maintained at all times. Swing-overs to new services shall be made so as to cause the least interruption to the facilities' operations

C. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not

interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.12 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours and Days: Limit work on the site and in the building to working hours indicated below, Monday through Saturday, unless otherwise indicated.

1. The school will be closed on Sundays and blackout days indicated below. If any Contractor wishes to work at any time when the school is normally closed, that Contractor must receive prior approval by the Owner and also shall arrange and pay for custodial services for the building at the applicable district pay rates. All work taking place within the schools/buildings/grounds on days and times that are outside of regular working hours must be approved in advance by the Owner.
2. Summer Work Period Hours and Days: During the Summer work will be permitted between 7:30 AM and 4:00 PM all days except Sundays. Any special work arrangements must be made through the Owner.
3. Blackout Dates (No work is permitted at the building or site): July 4, 2024.
4. The school district's academic calendar listing school-in-session period, summer period, school holidays and vacation days, and Regents Exam days can be found here https://www.chappaquaschools.org/uploaded/CCSD/Board_of_Education/CCSD_District_Calendar_Adopted_1-24-23.pdf

C. Delivery Restrictions: Coordinate with the Owner for permissible times and locations/truck access for deliveries on site. Large deliveries shall be made after hours.

D. Noise, Vibration, and Odors: Notify Owner and coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to surrounding spaces.

1. Notify Architect and Owner not less than two days in advance of proposed disruptive operations.

2. Construction activity noise levels for a period extending from the reading days before exams until the final day of exams (ten days) shall not exceed 60 dBA

E. Comply with Owner's standards for construction projects as follows:

1. Interaction with employees, students and the public is strictly forbidden.
2. Use of offensive or inappropriate language is strictly forbidden .
3. The use of radios, tape and CD players is prohibited on the site and in the buildings.
4. Smoking is prohibited on the site and in the buildings.
5. Use of controlled substances, cannabis and alcohol on Project site is not permitted.

1.13 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

Attachment: Sequence Narrative (Milestone Schedule)
Attachment: Project Milestone Schedule
Attachment: Multiple Prime Contractor Coordination Chart
Attachment: Bell MS Site Logistics
Attachment: Horace Greely HS Site Logistics
Attachment: Seven Bridges MS Site Logistic

CCSD – District Wide Capital Improvements – High School & Middle School Bid Package 2

Admin

1. **Notice to Proceed – 11/27/24**
2. **Submittals – 12/2/24 – 12/20/24**
3. **Procurement – 12/23/24 – 6/18/25**

Construction

Horace Greeley High School

- Mobilization (6/17/25)
- Demolition & Abatement (6/18/25 –7/9/25)
- Buildout (6/20/25 – 8/29/25)
    - **SUBSTANTIAL COMPLETION – 8/29/25**

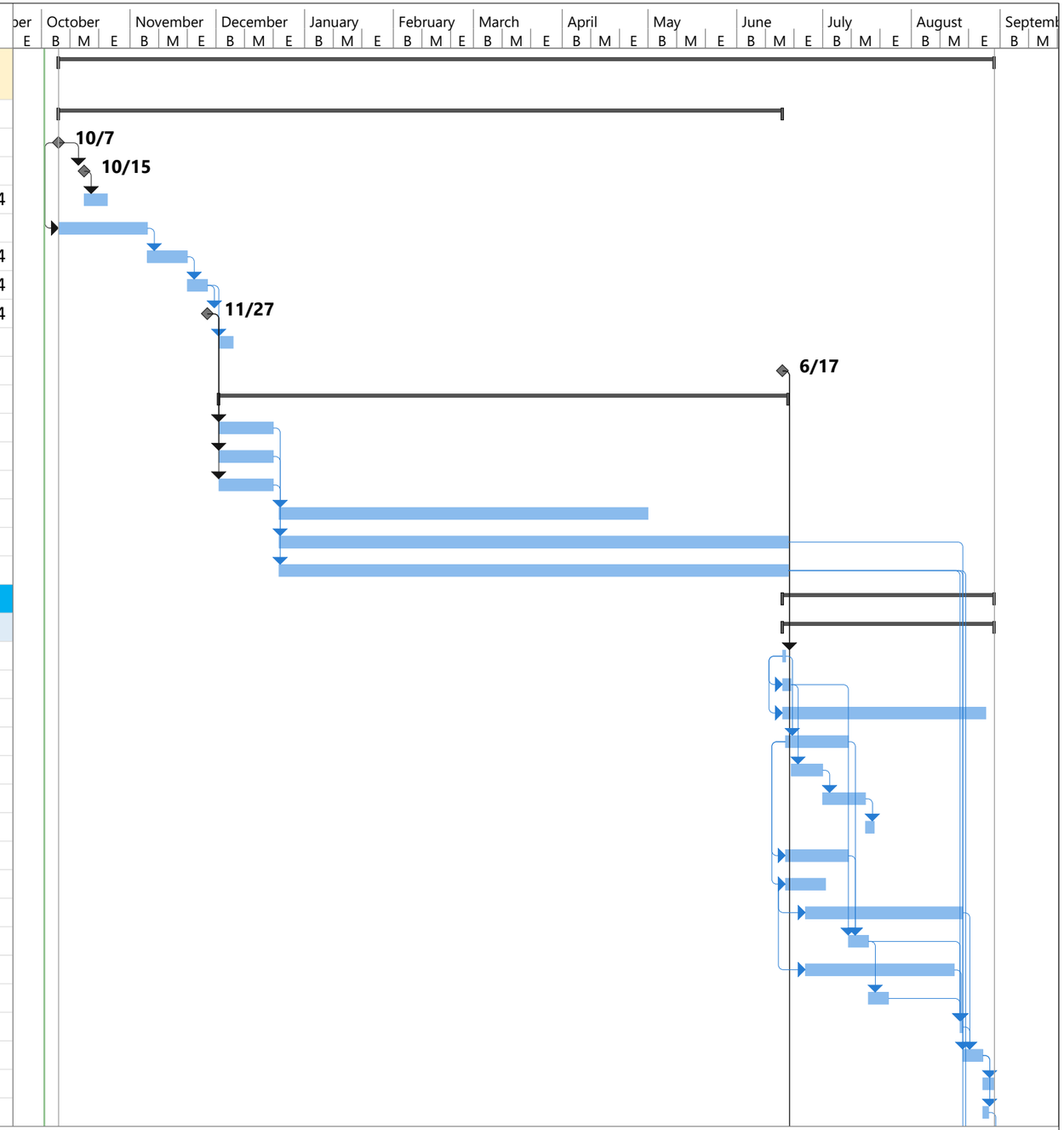
Robert E. Bell Middle School

- Mobilization (6/17/25)
- Demolition & Abatement (6/18/25 –7/9/25)
- Buildout (6/20/25 – 8/29/25)
    - **SUBSTANTIAL COMPLETION – 8/29/25**

7 Bridges Middle School

- Mobilization (6/17/25)
- Demolition (6/18/25 –7/9/25)
- Buildout (6/20/25 – 8/29/25)
    - **SUBSTANTIAL COMPLETION – 8/29/25**

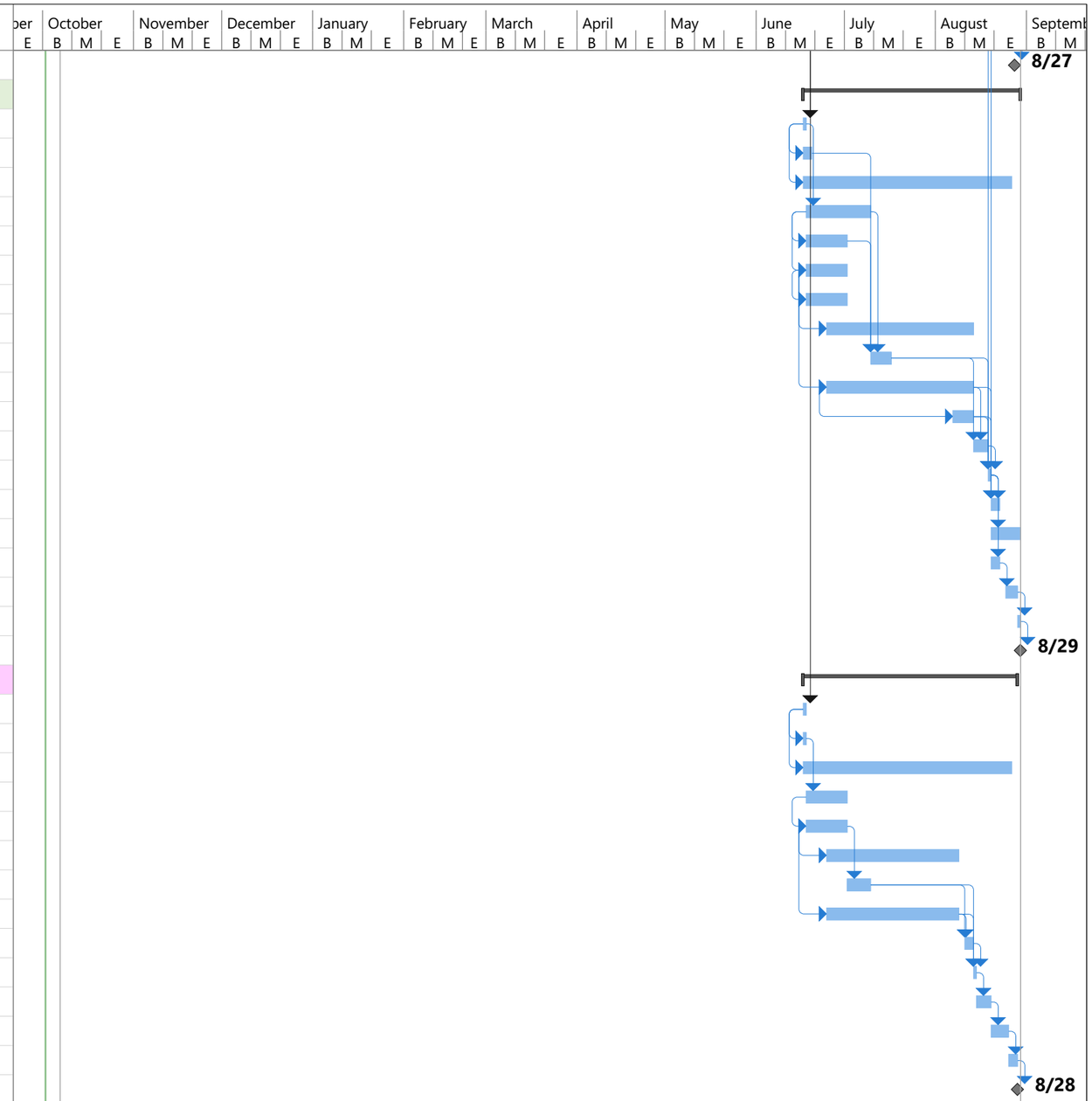
ID	Task Mode	Task Name	Duration	Start	Finish
1		**CCSD District Wide Capital Improvements - Middle School/High School - HVAC Upgrade**	**229 days**	**Mon 10/7/24**	**Fri 8/29/25**
2		**Admin**	**176 days**	**Mon 10/7/24**	**Tue 6/17/25**
3		Advertise	0 days	Mon 10/7/24	Mon 10/7/24
4		Bid Walk	0 days	Tue 10/15/24	Tue 10/15/24
5		RFI Deadline	6 days	Wed 10/16/24	Wed 10/23/24
6		Bidding	23 days	Mon 10/7/24	Wed 11/6/24
7		Pre-Qualification	10 days	Thu 11/7/24	Wed 11/20/24
8		Award	5 days	Thu 11/21/24	Wed 11/27/24
9		NOTICE TO PROCEED	0 days	Wed 11/27/24	Wed 11/27/24
10		Contract Insurance & Bonds	5 days	Mon 12/2/24	Fri 12/6/24
11		Summer Recess	0 days	Tue 6/17/25	Tue 6/17/25
12		**Procurement**	**140 days**	**Mon 12/2/24**	**Wed 6/18/25**
13		Submittal - GC	15 days	Mon 12/2/24	Fri 12/20/24
14		Submittal - Electric	15 days	Mon 12/2/24	Fri 12/20/24
15		Submittal -HVAC	15 days	Mon 12/2/24	Fri 12/20/24
16		Material Procurement - GC	90 days	Mon 12/23/24	Wed 4/30/25
17		Material Procurement - Electric	125 days	Mon 12/23/24	Wed 6/18/25
18		Material Procurement - HVAC	125 days	Mon 12/23/24	Wed 6/18/25
19		**CONSTRUCTION**	**53 days**	**Tue 6/17/25**	**Fri 8/29/25**
20		**Horace Greeley High School**	**53 days**	**Tue 6/17/25**	**Fri 8/29/25**
21		Mobilization & Site Protection	1 day	Tue 6/17/25	Tue 6/17/25
22		Site Survey and Layout	3 days	Tue 6/17/25	Thu 6/19/25
23		Associated GC Items and Coordination	50 days	Tue 6/17/25	Tue 8/26/25
24		Selective Abatement	15 days	Wed 6/18/25	Wed 7/9/25
25		Electrical Service Trenching	7 days	Fri 6/20/25	Mon 6/30/25
26		Installation of Underground Electrical Conduit	10 days	Tue 7/1/25	Tue 7/15/25
27		Trench Backfill and Asphalt Repair	3 days	Wed 7/16/25	Fri 7/18/25
28		Selective Demolition	15 days	Wed 6/18/25	Wed 7/9/25
29		MEP Demo and Removals	10 days	Wed 6/18/25	Tue 7/1/25
30		Electrical Rough-In	38 days	Wed 6/25/25	Mon 8/18/25
31		Supplemental Steel	5 days	Thu 7/10/25	Wed 7/16/25
32		HVAC Rough-In	37 days	Wed 6/25/25	Fri 8/15/25
33		Roof Penetrations and Curbs	5 days	Thu 7/17/25	Wed 7/23/25
34		Landing of Rooftop Equipment	1 day	Mon 8/18/25	Mon 8/18/25
35		Electrical Terminations	5 days	Tue 8/19/25	Mon 8/25/25
36		HVAC Controls	4 days	Tue 8/26/25	Fri 8/29/25
37		Startup & Balancing	2 days	Tue 8/26/25	Wed 8/27/25



Project: CCSD - HS-MS HVAC
Date: Wed 10/2/24

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

ID	Task Mode	Task Name	Duration	Start	Finish
38		SUBSTANTIAL COMPLETION	0 days	Wed 8/27/25	Wed 8/27/25
39		**Robert E. Bell Middle School**	**53 days**	**Tue 6/17/25**	**Fri 8/29/25**
40		Mobilization & Site Protection	1 day	Tue 6/17/25	Tue 6/17/25
41		Site Survey and Layout	3 days	Tue 6/17/25	Thu 6/19/25
42		Associated GC Items and Coordination	50 days	Tue 6/17/25	Tue 8/26/25
43		Selective Abatement	15 days	Wed 6/18/25	Wed 7/9/25
44		Selective Demolition	10 days	Wed 6/18/25	Tue 7/1/25
45		MEP Demo and Removals	10 days	Wed 6/18/25	Tue 7/1/25
46		Attic MEP Demo	10 days	Wed 6/18/25	Tue 7/1/25
47		Electrical Rough-In	35 days	Wed 6/25/25	Wed 8/13/25
48		Supplemental Steel	5 days	Thu 7/10/25	Wed 7/16/25
49		HVAC Rough-In	35 days	Wed 6/25/25	Wed 8/13/25
50		Attic Structural Demolition	5 days	Thu 8/7/25	Wed 8/13/25
51		Roof Penetration and Curbs	3 days	Thu 8/14/25	Mon 8/18/25
52		Landing of Rooftop/Attic Equipment	1 day	Tue 8/19/25	Tue 8/19/25
53		Installation of Attic Equipment	3 days	Wed 8/20/25	Fri 8/22/25
54		Attic Reconstruction	8 days	Wed 8/20/25	Fri 8/29/25
55		Electrical Terminations	3 days	Wed 8/20/25	Fri 8/22/25
56		HVAC Controls	4 days	Mon 8/25/25	Thu 8/28/25
57		Startup and Balancing	1 day	Fri 8/29/25	Fri 8/29/25
58		SUBSTANTIAL COMPLETION	0 days	Fri 8/29/25	Fri 8/29/25
59		**7 Bridges Middle School**	**52 days**	**Tue 6/17/25**	**Thu 8/29/25**
60		Mobilization & Site Protection	1 day	Tue 6/17/25	Tue 6/17/25
61		Site Survey and Layout	1 day	Tue 6/17/25	Tue 6/17/25
62		Associated GC Items and Coordination	50 days	Tue 6/17/25	Tue 8/26/25
63		Selective Demo	10 days	Wed 6/18/25	Tue 7/1/25
64		MEP Demo and Removals	10 days	Wed 6/18/25	Tue 7/1/25
65		Electrical Rough-In	32 days	Wed 6/25/25	Fri 8/8/25
66		Supplemental Steel	5 days	Wed 7/2/25	Wed 7/9/25
67		HVAC Rough-In	32 days	Wed 6/25/25	Fri 8/8/25
68		Roof penetrations and Curbs	3 days	Mon 8/11/25	Wed 8/13/25
69		Landing Rooftop Equipment	1 day	Thu 8/14/25	Thu 8/14/25
70		Electrical Terminations	3 days	Fri 8/15/25	Tue 8/19/25
71		HVAC Controls	4 days	Wed 8/20/25	Mon 8/25/25
72		Startup and Balancing	3 days	Tue 8/26/25	Thu 8/28/25
73		SUBSTANTIAL COMPLETION	0 days	Thu 8/28/25	Thu 8/29/25



Project: CCSD - HS-MS HVAC
Date: Wed 10/2/24

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			

10/1/2024

Chappaqua Central School District

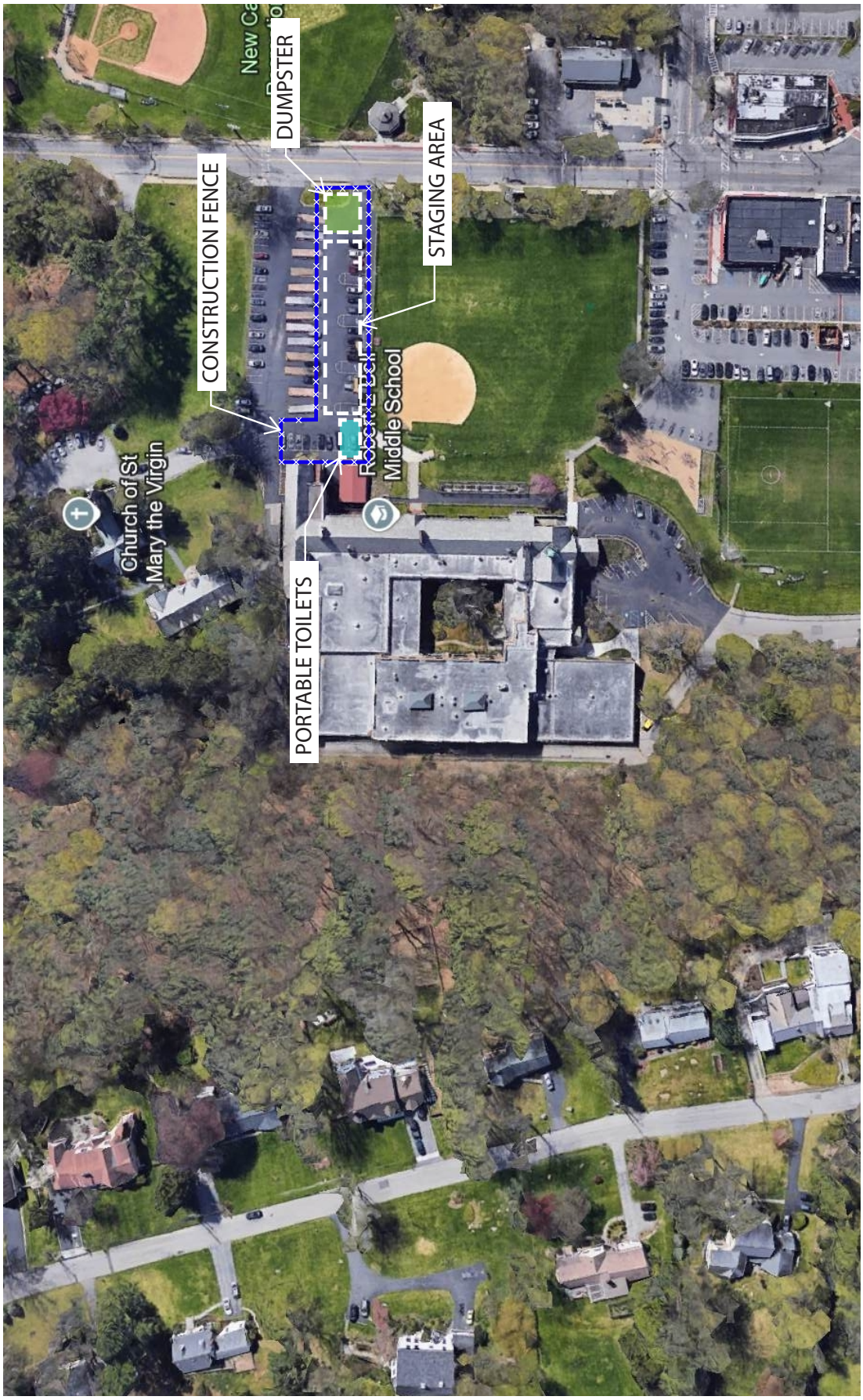
DISTRICT WIDE CAPITAL IMPROVEMENTS - HS/MS Bid Package 2

Multiple Prime Contractor Coordination Chart

Scope Item	Contract #1 General Construction	Contract #2 HVAC	Contract #3 Electrical
General Requirements	All contracts responsible	All contracts responsible	All contracts responsible
Project Scheduling	The “Final” agreed upon overall schedule of work shall be developed and maintained by the Prime Contractor for General Construction (G1) in conjunction with the Construction Manager utilizing each Prime Contractor’s Preliminary and updated Schedule(s).	Provide durations and updates for all HVAC work. Coordinate schedule with other primes.	Provide durations and updates for all Electrical work. Coordinate schedule with other primes.
Site Protection	Provide and maintain protection of site during construction		
Existing Gym Equipment	Remove, protect, and reinstall all existing gym equipment designated to remain.		
Erosion Control	All required erosion control measures including inlet protection and silt fencing.		
Site Fencing	Installation and maintenance of temporary site fencing.		
Trenching & Backfill for Utilities	Provide trenching, backfill, and surface restoration as required (pavement, sidewalk, curb, grass, etc.) of all contract. Excavation and installation of bollards. Installation of concrete pads for MEP.		
Abatement	Perform all abatement, coordinate with HVAC contractor. Patching of plaster ceiling where required.	Coordinate locations with GC.	
Site Electric	Excavate and backfill for all site electric. Provide enclosures as required.		Furnish and install conduit and wires.
Disconnects		Disconnect all HVAC as required.	Disconnect all electrical service as required.
Sleeves and Holes for Piping & Conduit	Provide all holes and openings for systems installed by this contract. Roof penetrations for HVAC.	Provide all holes and openings for systems installed by this contract.	Provide all holes and openings for systems installed by this contract.
Roof Curbs	Installation of provided curbs and associated waterproofing, flashing & temp protection.	Furnish roof curbs for equipment.	
Sky-Lights	Removal of existing skylights and the furnishing and installation of new.		

Scope Item	Contract #1 General Construction	Contract #2 HVAC	Contract #3 Electrical
Rooftop Duct and Conduit Supports		Furnish and install duct and HVAC related roofing supports and provide a waterproof finish.	Furnish and install conduit and electrical roofing supports and provide a water proof finish.
Supplemental Steel Supports and Roof Deck	Furnish and install supplemental steel for to support rooftop equipment, provide temp roof deck support, furnish and install metal roof deck and infills.	Coordinate support locations with GC.	Coordinate support locations with GC.
Existing Rooftop Equipment Removal		Coordinate roof equipment removal and temp watertightness with roofer.	Coordinate roof equipment removal and temp watertightness with roofer.
Patching & Firestopping	Provide all patching and firestopping for work of this contract.	Provide all patching and firestopping for work of this contract.	Provide all patching and firestopping for work of this contract.
Painting	Perform all painting as required.		
Millwork/Cabinet	Perform any millwork/cabinet restoration required due to new ductwork risers in classrooms	Coordinated locations with GC.	Coordinate roof equipment removal and temp watertightness with roofer.
Flooring	Perform all required flooring work.		
Cutting & Patching of Finished Services	Provide all finish patching where specifically assigned work.	Provide all finished patching except where GC is specifically assigned work.	Provide all finished patching except where GC is specifically assigned work.
Duct Penetrations in Masonry	Create required openings, furnish and installation of lintels.	Installation of ductwork through GC provided openings.	
Removal of Debris	Provide waste removal containers for specifically assigned work.	Provide waste removal containers for specifically assigned work.	Provide waste removal containers for specifically assigned work.
Building and Partition Layout	Provide all building and partition layout to facilitate the work of other prime contractors.		
Layout of Systems	Provide all layout for the work of this contract.	Provide all layout for the work of this contract.	Provide all layout for the work of this contract.
Coordination Drawings	All contracts responsible.	All contracts responsible.	All contracts responsible.
Cleaning During Construction	All contracts responsible.	All contracts responsible.	All contracts responsible.
Final Cleaning	Provide final cleaning of all areas.	Provide final cleaning of all fixtures equipment, and systems installed by this contractor.	Provide final cleaning of all fixtures equipment, and systems installed by this contractor.
Project Closeout	All contracts responsible.	All contracts responsible.	All contracts responsible.

This Chart is in addition to the requirements of the Contract Documents and is to be interpreted in conjunction with these documents


DUMPSTER
STAGING AREA
CONSTRUCTION FENCE
Middle School
Church of St Mary the Virgin
PORTABLE TOILETS

STAGING AREA
DUMPSTER
PORTABLE TOILETS
Roaring Brook Rd
Roaring Brook Rd
Horace Greeley High School
N Bedford Rd
N Bedford Rd
Bell Way
West Way
North Way
Bell Way
N Bedford Rd
Pin Oak Ln
Whippoorwill Rd

PORTABLE TOILETS
STAGING AREA
DUMPSTER
Hog Hill Rd
Hog Hill R

SECTION 011011 - REGULATIONS OF THE COMMISSIONER OF EDUCATION - 8 NYCRR 155.5 - UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION AND MAINTENANCE PROJECTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes Regulations of the Commissioner of Education - 8 NYCRR 155.5 - Uniform Safety Standards for School Construction and Maintenance Projects.

1.2 REGULATIONS OF THE COMMISSIONER OF EDUCATION - 8 NYCRR 155.5 - UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION AND MAINTENANCE PROJECTS

A. This Article indicates requirements for school construction and maintenance projects required under New York Codes Rules and Regulations, Regulations of the Commissioner of Education, Part 155, Section 155.5, and are binding on all Contracts of this Project.

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

C. Comply with general safety and security standards for construction projects as follows:

1. Store all construction materials in a safe and secure manner.
2. Provide and maintain fences around construction supplies or debris.
3. Maintain all gates locked at all times when school is in session, unless a worker is in attendance to prevent unauthorized entry.
4. Provide overhead protection during exterior renovation work, for any sidewalks or areas immediately beneath the work site, or fence off such areas and provide with warning signs to prevent entry.
5. Provide all workers with photo-identification badges that are required to be worn at all times for identification and security purposes while working at the project site.

D. Separation of Construction Areas from Occupied Spaces: Separate construction areas which are under the control of a contractor and therefore not occupied by district staff or students from occupied areas. Provide dust proof partitions to prevent dust and contaminants into occupied parts of the building. Provide periodic inspection and repairs of the containment barriers 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.

1. Workers may not use corridors, stairs or elevators designated for students or school staff.

2. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. No movement of debris through halls of occupied spaces of the building is permitted. No material shall be dropped or thrown outside the walls of the building.
3. Clean all occupied parts of the building affected by renovation activity at the close of each workday. Maintain required health, safety and educational capabilities at all times for school buildings occupied during a construction project when classes are in session.

E. Exiting: Maintain all building exits during construction. Comply with exiting plans incorporated in the Construction Documents. If exiting is modified other than as shown on the Contract Documents, provide a plan for Architect's review 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.

F. Ventilation: Comply with the ventilation plan incorporated in the Construction Documents. 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.

G. Fire and Hazard Prevention: Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy. In addition, the following shall be strictly enforced:

1. No smoking is allowed on public school property, including construction areas.
2. During construction daily inspections of district occupied areas shall be conducted by the Contractor's personnel to assure that construction materials, equipment or debris do not block fire exits or emergency egress windows.
3. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

H. Noise Abatement During Construction Activities: Contain noise from construction operations so as to not produce noise in excess of 60 dba in occupied spaces when school is in session, or schedule work for times when the building or affected building spaces are not occupied (school is not in session), or provide acoustical abatement measures to reduce noise to acceptable levels.

1. 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.

I. Control of Chemical Fumes, Gases, and Other Contaminants during Construction and Maintenance Projects: Control exhaust fumes from welding, gasoline engines, roofing, paving, painting, VOC fumes, or other fumes to assure they do not enter occupied portions of the building or fresh air intakes.

1. Schedule, cure or ventilate materials and activities to allow for "off-gassing" of volatile organic compounds introduced during construction before occupancy of school. Specific attention is warranted for materials and activities including, but not limited to, glues, paint, furniture, carpeting, wall coverings, and drapery.

    a. Air out building materials or furnishings which "off-gas" chemical fumes, gases, or other contaminants in one of the following manners:
        1) Air out in a well-ventilated heated warehouse before they are brought to the project for installation.
        2) Air out installed products in accordance with the manufacturer's recommended "off-gassing" periods by allowing this period of time to elapse prior to Substantial Completion date.

    b. 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.

2. Manufacturer's Material Safety Data Sheets (MSDS) shall be maintained at the site for all products used in the project. MSDS must be provided to anyone who requests them.

J. Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied. Note, It is The State Education Department’s interpretation that the term "building", as referenced in this Paragraph, 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.

    1. 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.

K. Lead-Based Paint Sampling and Analysis Notification: Surfaces containing lead will not be disturbed during construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011011

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

A. Unit price is 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.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes**,** 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

A. Unit Price No. 1 – Hazardous Material Abatement of Gypsum Board Compound: All work required for abatement of gypsum board compound, as indicated on the Drawings.

1. Unit of Measurement: Per square foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings.
3. Applicable to Contract 1 (General Construction)

B. Unit Price No. 2 - Hazardous Material Abatement of Tar Paper/Mastic on Metal Deck: All work required for abatement of tar paper/mastic on metal deck (bottom layer under 12" of roofing materials, as indicated on the Drawings.

1. Unit of Measurement: Per square foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings.
3. Applicable to Contract 1 (General Construction)

C. Unit Price No. 3 - Hazardous Material Abatement of Pipe Insulation/Fittings: All work required for abatement of pipe insulation/fittings, as indicated on the Drawings.

1. Unit of Measurement: Per linear foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings
3. Applicable to Contract 1 (General Construction)

D. Unit Price No. 4 - Hazardous Material Abatement of Duct Insulation Coating: All work required for abatement of duct insulation coating, as indicated on the Drawings.

1. Unit of Measurement: Per square foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings
3. Applicable to Contract 1 (General Construction)

E. Unit Price No. 5 – Hazardous Material Abatement of Caulking Associated with HVAC System: All work required for abatement of caulking associated with HVAC system, as indicated on the Drawings.

1. Unit of Measurement: Per linear foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings
3. Applicable to Contract 1 (General Construction)

F. Unit Price No. 6 - Hazardous Material Abatement Re-Mobilization Outside of Base Bid Work: All work required for re-mobilization for hazardous materials abatement work outside of Base Bid work.

1. Unit of Measurement: Per occurance.
2. Base Bid includes one occurrence for each of the two schools where abatement work occurs.
3. Applicable to Contract 1 (General Construction)

G. Unit Price No. 7 - Plaster and Lath Repair: All work required for provision of repair of plaster and lath at ceilings and walls of Bell MS gym.

1. Unit of Measurement: Per square foot, measured in place.
2. Base Bid includes amounts as indicated on Drawings
3. Applicable to Contract 1 (General Construction)

H. Unit Price No. 8 - Acoustical Ceiling Tile ACT Ceiling and Grid Replacement: All work required for replacement of ceiling tile and grid for acoustical ceiling type ACT as specified in Section 095113.

1. Unit of Measurement: Per square foot, measured in place.

2. Base Bid includes amounts as indicated on Drawings
3. Applicable to Contract 1 (General Construction)

I. Unit Price No. 9 - Acoustical Ceiling Tile Ceiling and Grid Replacement to Match Existing at High School: All work required for replacement of existing ceiling tile and grid at High School. The existing acoustical ceiling tile is Armstrong Optima Vector #3900, 24 by 24 inches by 7/8 inches thick, in white. The existing suspension system is Armstrong Prelude XL, 15/16 inches wide, with steel caps painted white.

1. Unit of Measurement: Per square foot, measured in place.
2. Base Bid includes no replacement ceiling tile and grid of this type.
3. Applicable to Contract 1 (General Construction)

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise 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 revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate #HG-1 (ADD ALTERNATE) TEMPORARY ELECTRIC: State the amount to be added to the Base Bid for temporary electrical equipment and wiring for power to select new HVAC equipment in Building "A" of Horace Greeley High School as shown in The Drawings.

1. Base Bid includes none of the alternate additional temporary power in Building "A" of Horace Greeley High School.
2. Applicable Contract: Contract No. 3 Electrical Work.
3.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 012300 "Alternates" for products selected under an alternate.
2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and assemblies which deviate from the requirements of the Contract Documents and proposed by Contractor which the Contractor deems will perform the same function and have equal capabilities, service life, economy of operations, and suitability for the intended purpose.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit requests for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use the electronic version of form included as an attachment to this Section; submit in portable document format (.pdf).
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable

Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures in .pdf format.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Change Order.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days after Notice of Award.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Requested substitution does not require revisions to the Contract Documents.
   c. Substitution request is fully documented and properly submitted.
   d. Requested substitution will not adversely affect Contractor's construction schedule.
   e. Requested substitution has received necessary approvals of authorities having jurisdiction.
   f. Requested substitution is compatible with other portions of the Work.
   g. Requested substitution has been coordinated with other portions of the Work.
   h. Requested substitution provides specified or superior warranty.
   i. Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule; or if requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
   j. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
   k. Maintenance service and source of replacement parts, as applicable, is available similar to the specified product.
   l. Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
   m. Proposed substitution does not affect dimensions and functional clearances.
   n. Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 15 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

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

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require revisions to the Contract Documents or, if revisions are required, the Contractor acknowledges that the cost of the Architect's redesign fee will be deducted from the Contract Price.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified or superior warranty.
j. Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule; or if requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
k. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
l. Maintenance service and source of replacement parts, as applicable, is available similar to the specified product.
m. Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
n. Proposed substitution does not affect dimensions and functional clearances.
o. Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

ATTACHMENT: SUBSTITUTION REQUEST FORM

SUBSTITUTION REQUEST FORM

To: _____ **Project:** _____

Section	Page	Paragraph	Specified Item

THE UNDERSIGNED REQUESTS CONSIDERATION OF THE FOLLOWING SUBSTITUTION:

Attached data shall include, in a tabular format to provide a line by line comparison - product description, specifications, drawings, photographs, performance and laboratory tests and the like with applicable portions of said data clearly identified.

FURTHER, The Proposed Substitution WILL (OR WILL NOT) Affect:

Dimensions indicated on the drawings?_____
Wiring, piping, ductwork, or other building services indicated on the drawings?_____
Other trades and abutting or interconnection work? _____
Manufacturer's guarantees and warranties? _____
The construction schedule? _____
Maintenance and service parts locally available? _____

(NOTE - If Substitution WILL affect any item above, explain in detail.)

In addition to the above, the undersigned agrees to pay for -

1. Any and all changes to the building design, including structural, civil or electro/mechanical systems engineering (if any), detailing; and
2. Any and all additional construction costs caused by the requested substitution.

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

SUBMITTED:	DESIGN PROFESSIONAL'S COMMENTS	
By:	Accepted	Accepted as Noted
Firm: _	Not Accepted	Received Too Late
Address:		
		By:
Date:		Date:
Telephone/Fax:		Remarks:
Approved For Subcontractor Submittal:		
By:	Contractor:	Date:

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

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

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.4 ADMINISTRATIVE CHANGE ORDERS

A. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.5 CHANGE ORDER PROCEDURES

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

1.6 CONSTRUCTION CHANGE DIRECTIVE

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

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

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

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect and Construction Manager within 10 days after Notice of Award of Contract or at the preconstruction meeting, whichever comes first.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
   a. Project name and location.
   b. Name of Architect.
   c. Name of Construction Manager
   d. Architect's project number.
   e. SED number
   f. Contractor's name and address.
   g. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
   a. Related specification section or division.
   b. Description of the Work.

c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that reflect value.
g. Dollar value as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum. No line item should exceed 10% of the contract sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Include a line item for each of the following in the specified percentage of the Contract Sum:
   a. Submittals and Shop Drawings: 1%
   b. Meetings and Documentation: 2%
   c. O&M and Closeout: 3%
   d. Punch List: 1%

10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when fully executed Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
2. Each Application for Payment after the Initial Application for Payment shall include lien wavers for amounts paid with respect to the immediately preceding Application for Payment.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect and Construction Manager.

C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Payrolls and Payroll Records:

1. In accordance with Article 8, Section 220 of the New York State Labor Law, every contractor and subcontractor must keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be

maintained for at least three years from the project's date of completion. At a minimum, payrolls must show the following information for each person employed on a public work project:

a. Name
b. Classification(s) in which the worker was employed
c. Hourly wage rate(s) paid
d. Supplements paid or provided
e. Daily and weekly number of hours worked in each classification.

2. Every contractor and subcontractor shall submit, within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
   a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5. Waiver Forms:
   a. Submit partial waivers of lien on Partial Waiver of Liens Form included at the end of this Section, executed in a manner acceptable to Owner.
   b. Submit final waivers of lien on Final Waiver of Liens Form included at the end of this Section, executed in a manner acceptable to Owner

H. Attachments to Applications for Payment: In addition to other requirements stated in the Contract Documents, include with each Application for Payment fully executed Partial Waiver of Liens Form and/or Final Waiver of Liens Form as applicable, and Payroll Certification on the forms included at the end of this Section. In addition, provide a current copy of the approved Contractor’s Construction Schedule, signed by all Prime Contractors, indicating agreement to the schedule.

I. Transmittal: Submit two signed and notarized original copies of each Application for Payment to the Construction Manager by a method ensuring receipt within 24 hours. Both copies shall include waivers of lien, payroll certification forms and all other required attachments.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

J. Initial Application for Payment: Administrative actions and submittals (that have been previously approved) that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule.
4. Products list.
5. Submittal schedule.
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.
13. Performance and payment bonds.
14. Data needed to acquire Owner's insurance.
15. Initial settlement survey and damage report if required

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

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

L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

Attachments: Partial Waiver of Liens Form
Final Waiver of Liens Form
Payroll Certification Form

REQUISITION FOR PARTIAL PAYMENT - WAIVER OF LIENS

PROJECT	**OWNER**
GENERAL CONTRACTOR	**SUBCONTRACTOR/VENDOR**
CONTRACT	**WORK COMPLETE**
PROJECT:	CONTRACT - $
TRADE:	CHANGE ORDERS - $
CONTRACT - $	TOTAL COMPLETE - $
CHANGE ORDERS - $	RETAINAGE (___%) - $
TOTAL CONTRACT - $	LESS PRE. REQ. - $
	THIS REQUISITION - $

Waiver of Lien

The undersigned, upon receipt of the above requisition payment hereby releases and discharges the Owner of and from any liability or obligation in any way related to or arising out of this project up to and including the date of this document.

The undersigned further covenants and agrees that it shall not in any way claim or file a mechanic's or other lien against the premises of the above designated project, or any part thereof, or against any fund applicable thereto for any of the work, labor, materials heretofore furnished by it in connection with the improvement of said premises.

The undersigned further warrants that, in order to induce the Owner to release this partial payment, they have paid all claims for labor, material, insurance, taxes, equipment, etc., employed in the prosecution of the work above, to date of this requisition.

The undersigned hereby releases and agrees to hold the Owner harmless from any and all claims in connection with the furnishing of such labor and materials, etc., for the construction of the aforementioned project.

The undersigned further guarantees that all portions of the work furnished and/or provided by them are in accordance with the contract and that the terms of the contract with respect to these guarantees will hold for the period specified in said contract.

IN WITNESS WHEREOF, we have executed under seal this release on the date below and to be legally bound hereby:

WITNESS: _____ FIRM: _____

BY: _____ DATE: _____

CORPORATE ACKNOWLEDGEMENT

State of
)SS.
)
County of

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ _____; that he is the officer of the said corporation executing the foregoing instrument, that he knows the seal of said corporation, that the seal affixed to said instrument is such corporate seal, that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

_____
Notary Public

INDIVIDUAL ACKNOWLEDGEMENT

State of
)SS.
)
County of

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ _____ that he is the individual who executed the foregoing instrument.

_____
Notary Public

PARTNERSHIP ACKNOWLEDGEMENT

State of
)SS.
)
County of

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ _____; that he is the partner in the firm of _____ doing business under the name of _____ and that he executed the foregoing instrument on behalf of said partnership.

_____
Notary Public

Print Form

CONTRACTOR/VENDOR FINAL RELEASE AND LIEN WAIVER

The undersigned represents and warrants that it has been paid and has received (or that it will be paid and will receive via proceeds from this pay application) $_____ as full and final settlement under the contract/agreement dated _____ (including any amendments or modifications thereto) (the "**Contract**") between the undersigned and _____ ("**Contractor/Vendor**") for the _____ Project owned by _____ ("**Owner**") (PO Number: _____). In consideration for this final payment, and other good and valuable consideration, receipt of which is acknowledged, the undersigned makes the following representations and warranties:

1. The undersigned and Owner have fully settled all terms and conditions of the Contract (including any amendments or modifications thereto), as well as any other written or oral commitments, agreements, and/or understandings in connection with the Project.
2. The undersigned has been paid in full (or it will be paid in full via proceeds from this pay application) for the labor, services, and materials in connection with the Contract, including all work performed or any materials provided by its subcontractors, vendors, suppliers, materialmen, laborers, or other persons or entities.
3. The undersigned has paid in full (or it will pay in full via proceeds from this pay application) all its subcontractors, vendors, suppliers, materialmen, laborers, and other person or entity providing services, labor, or materials to the Project; there are no outstanding claims, demands, or rights to liens against the undersigned, the Project, or the Owner in connection with the Contract on the part of any person or entity; and no claims, demands, or liens have been filed against the undersigned, the Project, or the Owner relating to the Contract.
4. The undersigned releases and discharges Owner from all claims, demands, or causes of action (including all lien claims and rights) that the undersigned has, or might have, under any present or future law, against Owner in connection with the Contract. The undersigned hereby specifically waives and releases any lien or claim or right to lien in connection with the Contract against Owner, Owner's property, and the Project, and also specifically waives, to the extent allowed by law, all liens, claims, or rights of lien in connection with the Contract by the undersigned's subcontractors, materialmen, laborers, and all other persons or entities furnishing services, labor, or materials in connection with the Contract.
5. The undersigned shall indemnify, defend, and hold harmless Owner from any action, proceeding, arbitration, claim, demand, lien, or right to lien relating to the Contract, and shall pay any costs, expenses, and/or attorneys' fees incurred by Owner in connection therewith.

The undersigned makes the foregoing representations and warranties with full knowledge that Owner shall be entitled to rely upon the truth and accuracy thereof.

DATED: _____

_____
(Contractor/Vendor company name)
By: _____
Title: _____

STATE OF_____
COUNTY OF _____

I, a Notary Public for the above County and State, certify that _____ personally came before me this day and acknowledged that he/she is _____ [title] of _____ [company name], and that he/she, as _____ [title], being authorized to do so, executed the foregoing on behalf of _____ [company name]. Witness my hand and official seal this ____ day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID.

PAYROLL CERTIFICATION

_____ am an officer with the title of _____

in the firm of _____ and am authorized by that firm to sign and swear, under penalty of perjury, to the validity and accuracy of the statements below.

(1) I pay or supervise the payment of laborers, workers and mechanics employed by _____ _____ on the _____ project. During the payroll period commencing on the _____ day of _____ 20___ and ending the _____ day of _____ 20_____ all laborers, workers and mechanics employed on said project were paid the wages and supplements recorded as earned on the attached payroll records. No deductions have been made either directly or indirectly from the wages and supplements other than deductions shown on the payroll records.

(2) The payroll records submitted for the above project and attached hereto are correct and complete, and the wage rates for laborers, workers, and mechanics contained therein are not less than the applicable wage rates stated in the Contract and as designated by the State Labor Department. The number of hours shown for each employee reflects the actual hours worked by that employee. The classification shown for each employee is accurate and conforms with the work he or she performed.

(3) Supplements required in the Contract that are in addition to the basic hourly wages have been or will be paid to the appropriate plans, funds or programs.

(4) Such statement so to be filed shall be verified by the oath of the Contractor that he or she has read such statement subscribed by him or her and knows the content thereof, and that the same is true of his or her own knowledge except with respect to wages and supplements owing by subcontractors which may be certified upon information and belief.

(5) All employees of this firm have submitted completed Form I-9, Employment Eligibility Verification Form which has been reviewed and signed by authorized representatives of the firm and are kept in the employees' file. Also, any and all subcontractors have certified to us that all of their employees have submitted completed Form I-9 Employment Eligibility Verification Form, which have been reviewed and signed by authorized representatives of the firm and are kept in the employees' file.

By: _____

Title: _____

Date: _____

Firm Name _____

Firm Address _____

Prime

Subcontractor

NOTARY

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project Information Management (PIM) software.
4. Project meetings.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

B. 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.

1.3 INFORMATIONAL SUBMITTALS

A. 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 list of subcontractors within 10 days after Notice of Award of Contract or at the preconstruction meeting, whichever comes first.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone

numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

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

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

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

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

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

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

F. Use of the Site: The Construction Manager will administer allocation of available space equitably among separate Prime Contractors and other entities needing access and space, so as to produce the best overall efficiency in performance of the total work of the project. Each Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1.5 REQUESTS FOR INFORMATION (RFIs)

A. Requests for Information (RFI's) are requests for clarifications or questions regarding the contract drawings and specifications, not contract terms, scheduling items, or general correspondence, nor, are they to be as a means to describe or request approval of alternate construction means, methods or concepts or substitution for materials, systems means and methods.

1. Carefully study and compare the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, and prior Project correspondence and documentation prior to submitting a Request for Information.

B. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

C. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect and Construction Manager
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

D. RFI Forms: Architect will furnish electronic version of form bound in Project Manual.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

E. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. Based upon the amount of RFI's received and their level of content, the Architect will establish the level of importance of each RFI and allow sufficient time in the Architect's professional judgment to permit adequate review.
2. The following Contractor-generated RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for approval of Contractor's means and methods.
d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

3. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
4. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit a change proposal according to the General Conditions of the Contract

a. If the Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 15 calendar days of receipt of the RFI response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly; include the following: .

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect and Construction Manager.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

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

1.6 PROJECT INFORMATION MANAGEMENT (PIM) SITE

A. Use the Project Information Management (PIM) software transmission server software for purposes of hosting and managing project communication and documentation until Final Completion. Project Information Management (PIM) software site includes the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting minutes.
4. Contract modifications forms and logs.
5. RFI forms and logs.
6. Task and issue management.
7. Photo documentation.
8. Schedule and calendar management.
9. Submittals forms and logs.
10. Payment application forms.
11. Drawing and specification document hosting, viewing, and updating.
12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.

B. Owner will provide Project Information Management (PIM) software user licenses for use of the Architect, Contractor, Construction Manager, and Architect's consultants.

C. The project will utilize Submittal Exchange Project Information Management (PIM) software to track submittals and RFI’s.

D. Post electronic submittals as PDF electronic files directly to the Submittal Exchange server, specifically established for Project.

1.7 PROJECT MEETINGS

A. General: The Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Construction Manager will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Construction Manager will notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Construction Manager will prepare the meeting agenda and distribute the agenda to all invited attendees.
3. Minutes: Construction Manager will record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned, including Owner, and Architect, within three days of the meeting.

B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 14 days after Notice to Proceed.

a. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; 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 Project and authorized to conclude matters relating to the Work.

b. Agenda: Discuss items of significance that could affect progress, including the following:

1) Tentative construction schedule.
2) Phasing.
3) Critical work sequencing.
4) Designation of responsible personnel.
5) Procedures for processing field decisions and Change Orders.
6) Procedures for processing Applications for Payment.
7) Distribution of the Contract Documents.
8) Submittal procedures.
9) Preparation of Record Documents Procedures for RFIs.
10) Use of the premises and existing building.
11) Work restrictions.
12) Working hours.
13) Owner's occupancy requirements.
14) Procedures for moisture and mold control.
15) Procedures for disruptions and shutdowns.
16) Construction waste management and recycling.
17) Parking availability.
18) Office, work, and storage areas.
19) Equipment deliveries and priorities.
20) First aid.
21) Progress cleaning.
22) Responsibility for temporary facilities and controls.
23) Security
24) Waste management protocols.

c. Contractor shall submit the following items at this meeting:
1) Preliminary Contractor's Construction Schedule (if schedule has not yet been submitted).
2) List of Subcontractors.
3) Schedule of Values.
4) Submittal Schedule.
5) Products List (Proposed products and manufacturers including any substitution products proposed).

2. Minutes: Construction Manager will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of 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 Architect and Construction Manager of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility requirements.
    k. Time schedules.
    l. Weather limitations.
    m. Manufacturer's written instructions.
    n. Warranty requirements.
    o. Compatibility of materials.
    p. Acceptability of substrates.
    q. Temporary facilities and controls.
    r. Space and access limitations.
    s. Regulations of authorities having jurisdiction.
    t. Testing and inspecting requirements.
    u. Installation procedures.
    v. Coordination with other work.
    w. Required performance results.
    x. Protection of adjacent work.
    y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Contractor, Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Construction Manager will conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers;

and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Requirements for preparing operations and maintenance data.
    e. Requirements for delivery of material samples, attic stock, and spare parts.
    f. Requirements for demonstration and training.
    g. Preparation of Contractor's punch list.
    h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    i. Submittal procedures.
    j. Coordination of separate contracts.
    k. Owner's partial occupancy requirements.
    l. Installation of Owner's furniture, fixtures, and equipment.
    m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Construction Manager will conduct progress meetings at bi-weekly or twice monthly intervals.

1. Coordinate preparation of payment requests with dates of meetings.
2. Attendees: In addition to representatives of Owner, Contractor and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
    a. A representative of Contractor shall be present at every progress meeting, regardless of whether or not that Contractor is performing work at the site at the time.
    b. Any decision reached at a job meeting shall be binding on a Contractor, whether or not he or his representative is present at such job meeting.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period (2-week look ahead schedule)

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Construction Change Directives.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.
20) Waste management.

4. Minutes: Construction Manager will record and distribute the meeting minutes to each party present, to others affected by decisions or actions resulting from each meeting and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting

F. Coordination Meetings: Construction Manager will conduct Project coordination meetings at bi-weekly intervals or as required by the Construction Manager. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Construction Manager and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work
2. Agenda: Coordinate work for the ensuing two weeks. Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. At the close of the meeting, each prime Contractor shall, in an agreed format, provide a summarized two week work plan to the Construction Manager.

3. Any decision reached at a job meeting shall be binding on a Contractor, whether or not he or his representative is present at such job meeting
4. Reporting: Construction Manager will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

ATTACHMENT:

REQUEST FOR INFORMATION FORM

REQUEST FOR INFORMATION (RFI FORMAT)

Contractor:		Architect: KG&D Architects, PC	
Address:		Address: 285 Main Street, Mt. Kisco, NY 10549	
Telephone:		Telephone: 914-666-5900	
Fax:		Fax: 914-666-0051	
Email:		Email: rcarper@kgdarchitects.com	
Project Name:		Project Location:	
RFI Number:	Date of Request:	Requested Date of Response (5 business days minimum):	
Description, complete with backup data as necessary attached hereto:			
Sketches of Conditions	Specification Paragraph Reference(s):	Drawing Reference(s):	
Proposed Solution:			
Cost Impact:		Time Impact:	
Trade/Specialty Contractors Affected:			
Trade/Specialty Contractors Coordinated With:			
Submitted By:			
Architect's Response:			
By:		Date of Response:	

SECTION 013115 – COORDINATION DRAWINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes preparation of coordination drawings for architectural, structural, mechanical, plumbing, fire protection, fire alarm, lighting, information technology, security, and electrical Work.

B. Related Sections include the following:

1. Division 21, 22, 23, 26, 27 and 28 for additional requirements.

1.2 DEFINITION AND INTENT

A. The Contract Drawings are diagrammatic only and are not intended to show the alignment, exact physical locations, or configurations of such Work. Performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. Where possible, 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 coordination drawings.

B. Coordination drawings are drawings prepared by Contractor that superimpose Work of multiple trades involved in the construction process. Coordination drawings indicate systems and components to be installed by the Contractor to maximize clear height and free area in ceiling cavities, allow for proper and adequate equipment service clearances, minimize space required by shafts and chases and provide the most efficient functioning and use of materials possible while complying with the final performance and finished appearance required by the Contract Documents.

C. Coordination drawings are intended to show the relationship and integration of different construction elements that require coordination during fabrication or installation to fit in the space provided, to function as intended, and to present the intended final finished appearance.

D. Coordination Drawings are not a replacement for shop drawings specified in the technical specifications or the Record Drawings required in Division 01.

E. The Contractor shall manage the process so that each trade/ sub contractor provides all required information in a timely manner. Coordination Drawings may be completed on a phased basis so as not to delay the overall project schedule. The CPM Schedule specified elsewhere in Division 01 Section “Construction Progress Documentation” shall include the submission of Coordination Drawings. The same shall demonstrate how the Contractor intends to integrate the submission of Coordination Drawings to suit the overall project schedule. The Contractor shall pay all costs for reproducing copies of coordination drawings for use in the field.

F. Contractor shall maintain equipment access and pathways as indicated on the Drawings. Floor space in MEP equipment rooms shall be maintained as indicated on the Architectural Drawings. Contractor shall clearly indicate access and floor space to be maintained in coordinated shop drawings submitted to the Owner and Architect as per the Specifications.

G. Fully coordinated Ceiling Coordination Drawings must be received and approved by the Architect before any associated ceiling shop drawings of any trade will be reviewed.

H. Sprinkler heads depicted on architectural drawings are intended to indicate design intent of layout only.

1.3 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. Refer to Division 01 Section “Submittal Procedures” for availability of and use of Architect’s CAD Background Drawings.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare and submit as informational submittal within 15 days of Notice to Proceed.

B. Submit coordination drawings in the same manner as shop drawings; refer to Section 013300 Submittal Procedures.

1.5 PROJECT CONDITIONS

A. Maintain marked up set of coordination drawings at Project site available for reference by Owner, Construction Manager and Architect.

B. Maintain original CAD drawings or base drawings used to produce coordination drawings updated with revisions to reflect actual construction. Make drawing revisions at time of change to construction; Transfer information to CAD drawings no later than every 7 days.

C. Failure to submit coordination drawings will result in no changes to contract sum for necessary corrections to uncoordinated work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION OF COORDINATION DRAWINGS, GENERAL

A. Prepare coordination drawings for Project using CAD drawings or similar coordination documentation overlay drawings indicating coordination of the project.

B. CAD Drawings: Produce coordination drawings and overlays using Architect's electronic base drawings furnished by the Architect.

1. Each Prime Contractor shall be assigned a layer to create the detailing work of each section or division of the Specifications requiring coordination. Each Prime Contractor shall ensure that the layer assigned to them cannot be modified by another Contractor or trade, and that the final product clearly differentiates which Contractor or trade is responsible for the respective information shown. The latter may occur through the use of colors or other distinct graphic methods.

C. The Construction Manager will assume overall coordination responsibilities for the preparation of the coordination drawings, and shall work in collaboration with each Prime Contractor to coordinate work by more than one contract.

1. The Construction Manager will coordinate the addition of trade-specific information to coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components.

3.2 INFORMATION REQUIRED IN COORDINATION DRAWINGS

A. Architectural Work Information Required in Coordination Drawings:

1. Items which are recessed into ceilings and ceiling plenums, or surface mounted to ceilings.
2. Anchorages, fastenings, and supporting for items recessed in, attached to, or suspended from ceilings or structure above ceilings.
3. Firewalls, Fire Barrier, Fire partitions and smoke partitions on coordination drawings for coordination of life safety requirements.

B. Plumbing Work Information Required in Coordination Drawings:

1. Sizes and bottom elevations of piping with insulation thickness included.
2. Dimensions of major components, such valves, access doors and cleanouts.
3. Fire-rated enclosures around piping
4. Support of all roof mounted plumbing piping and equipment.
5. Required space to install, service and maintain all plumbing mechanical items and systems.

C. HVAC Work Information Required in Coordination Drawings:

1. Sizes and bottom elevations of ductwork, piping with insulation thickness included.
2. Fire dampers.
3. Acoustical lining in ductwork.
4. Identification of ductwork pressure class.
5. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
6. Fire-rated enclosures around ductwork.
7. Support of all roof mounted HVAC piping and equipment.
8. Required space to install, service and maintain all HVAC items and systems.

D. Electrical Work Information Required in Coordination Drawings:

1. Electrical Work, including telecommunications, data, security, lighting and fire alarm systems.
2. Runs of vertical and horizontal conduit 1-1/4-inch diameter and larger.
3. Light fixture locations.
4. Emergency egress light locations.
5. Smoke detector, and other fire alarm device locations.
6. Panelboard, switchboard, transformer, cable tray, and motor control center, and exit signs.
7. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Bottom elevation of all conduit runs 1-1/4 -inch diameter and larger and of all cable trays.
9. Support of all roof mounted conduit and photovoltaic equipment, cameras, and security system devices.
10. Required space to install, service and maintain all electrical items and systems.
11. Lightning protection.

E. Fire Protection System Information Required in Coordination Drawings:

1. Locations of standpipes, valves, mains piping, branch lines, pipe drops, and sprinkler heads.
2. Bottom elevation of main and branch lines.

F. Structural Work Information Required in Coordination Drawings:

1. Ceiling system.
2. Openings and sleeve locations required in slabs, walls, beams and other structural elements, including required openings not indicated on Contract Documents.
3. Slab edge locations and locations of sleeves dimensioned from building lines and floor lines.

G. Ceiling Systems and Plenum Space in Coordination Drawings:

1. For mechanical, plumbing, fire protection, fire alarm, electrical, controls, and telecommunications Work penetrating acoustical ceilings, show locations of each item (including sprinkler heads, diffusers, grilles, access doors, light fixtures, smoke detectors, exit signs, speakers, and other visible ceiling mounted devices) relative to acoustical ceiling grid or to wall in gypsum board ceilings.
2. Locate components within ceiling plenums to maximize clear area for future installations of lights and equipment.
3. Clearly indicate areas of conflict between light fixtures, diffusers and grilles and plenum boxes and other components on coordination drawings.
4. Draw elements to dimensions appropriate for products to be installed. Use of symbols is not acceptable.

3.3 CONFLICTS IN COORDINATION DRAWINGS

A. The Construction Manager will review the Coordination Drawings to identify areas of conflicts and obstacles, and together with the separate Prime Contractors, work to

resolve the trade conflicts as well as clashes within each trade, until all conflicts are fully coordinated.

1. Each Prime Contractor shall revise their respective portions of the Coordination Drawings to eliminate the collisions and interferences identified.
2. Each Prime Contractor shall determine that all work can be installed without interference.
3. Each Prime Contractor shall approve the revised Coordination Drawings in writing indicating approval of installation coordination and clearances.

B. In the case of unresolved interference, the Construction Manager will notify the Architect. The Architect will then suggest to the Construction Manager as to how to revise the Coordination Drawings to eliminate interference. The Prime Contractors shall then revise their respective Drawings to eliminate the interference.

1. Each Prime Contractor shall approve the revised Coordination Drawings in writing indicating approval of installation coordination and clearances.

3.4 PREPARATION OF COORDINATION DRAWINGS

A. Organize coordination drawing submittals as follows:

1. Floor Plans: Provide floor plans and reflected ceiling plans for all floors. Show architectural, structural, mechanical, plumbing, fire protection, fire alarm, electrical, and telecommunications elements on floor plans and reflected ceiling plans.
2. Equipment Rooms and Spaces: Provide large scale drawings for equipment rooms and spaces showing plans and elevations of mechanical, plumbing, fire protection, electrical, and telecommunications equipment.
3. Structural Penetrations: Provide coordination drawings for each floor indicating penetrations and openings required for all trades.
4. In public and occupied areas without scheduled finish ceilings, appearance is a major coordination factor. Reposition proposed locations of work after Coordination Drawing review by the Architect. Provide adjustments to the exact size, location and offsets of ducts, pipes, and conduit to achieve reasonable appearance objectives. Provide these adjustments as part of the Contract or notify the Architect immediately as to why the adjustment cannot be made.

B. Prepare coordination drawings to a scale of 1/4" = 1'- 0" or larger (1/2"= 1'-0" for mechanical room plans); detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Detail complex areas at larger scale than typical floor plans.
2. Use a common architectural layout as background.
3. Indicate ductwork, pipes with 6-inch diameter and greater, and conduits with 3-inch diameter and greater by double lines. Use single lines for smaller mechanical piping and all electrical conduits. Draw piping, ductwork, lighting fixtures, and cable trays in scale.

4. Circle and clearly note deviations from Contract Documents with reason for deviation stated.
5. Provide name of representative of each subcontractor whose Work is indicated on coordination drawings, verifying their review and approval that their Work has been coordinated with each other trade and with architectural and structural Work.

END OF SECTION 013115

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction Manager’s construction schedule.
4. Project construction schedule
5. Construction schedule updating reports.
6. Daily construction reports.
7. Site condition reports.
8. Special reports.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
2. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.2 DEFINITIONS

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

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

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

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

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Milestone: A key or critical point in time for reference or measurement.

G. Contractor's Construction Schedule: A construction schedule for the Work of a Prime Contractor, prepared by that Prime Contractor.

H. Construction Manager's Construction Schedule: A construction schedule for the Project, prepared by the Construction Manager with no input from Prime Contractors, indicating milestones, Phasing, and other general requirements for the prosecution of the Work of all Contracts.

I. Project Construction Schedule: A coordinated construction schedule for the Project, prepared and maintained by the Construction Manager, indicating an overall construction schedule for the entire Project with input from all Prime Contractors, coordinated by the Construction Manager, and accepted by all Prime Contractors.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF electronic file.

B. Startup construction schedule.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals
2. Construction Manager will review schedule for compliance with Construction Manager's Construction Schedule

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at monthly intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

H. Special Reports: Submit at time of unusual event.

I. Qualification Data: For scheduling personnel.

1.4 QUALITY ASSURANCE

A. Scheduling Personnel Qualifications: A consultant or a person in the Contractor's employ who is experienced in CPM project scheduling and reporting, with capability of reviewing Construction Manager's Construction Schedule and Project Construction Schedule, correlating them with Contractor's Construction Schedule, and providing feedback reports within time schedule specified.

B. Prescheduling Conference: After receipt of preliminary Contractor's Construction Schedule from all Prime Contractors, Construction Manager will conduct a schedule review and coordination conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Construction Manager will review methods and procedures related to the Project Construction Schedule including, but not limited to, the following:

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

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. The form of the Contractor's Construction Schedule will be a CPM schedule.

B. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

C. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

D. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

E. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

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

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use-of-premises restrictions.
    f. Provisions for future construction.

g. Seasonal variations.
h. Environmental control.

6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Submittals.
c. Purchases.
d. Mockups.
e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Startup and placement into final use and operation.

G. Milestones: Include milestones indicated in the Contract Documents and in the Construction Manager's Construction Schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the interim milestones indicated on the Schedule.

H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

I. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.
4. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

J. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule

indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

K. Distribution: Distribute copies of approved schedule to Architect**,** Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 PROJECT CONSTRUCTION SCHEDULE

A. Form: The form of the Project Construction Schedule will be a CPM schedule.

B. Responsibilities: The Construction Manager will provide services as the overall project scheduling coordinator for Project planning, scheduling and control. The Construction Manager will prepare and maintain the overall Project Construction Schedule with input from the Prime Contractors.

C. Preparation: The procedure for the preparation of the Project Construction Schedule shall be as follows:

1. Within 10 days after Notice of Award of Contract or at the preconstruction meeting, whichever comes first, each Prime Contractor shall prepare and submit to the Construction Manager, for review and coordination, a detailed start up Contractor's Construction Schedule for his Work showing the details of his compliance with the Construction Manager's Construction Schedule. Contractor's Construction Schedule shall indicate that the Phases of the Project be Substantially Complete by the dates indicated in the Construction Manager's Construction Schedule.
2. The Construction Manager will review the Contractor's Construction Schedule and shall advise the Contractor if its schedule is acceptable for incorporation into the Project Construction Schedule, or if revisions will have to be made.
3. Each Prime Contractor shall cooperate with each other and with the Construction Manager in coordinating each Contractor's Construction Schedule to produce the Project Construction Schedule.
4. When the coordinated Project Construction Schedule is produced by the Construction Manager, each Prime Contractor shall signify acceptance of Schedule by signing the schedule.

D. Updates/Revisions: The Construction Manager will update the Project Construction Schedule at bi-weekly intervals to reflect actual construction progress and activities, based on feedback reports of Prime Contractors. Each Prime Contractor shall issue revised scheduling report (update) to the Construction Manager one week before each regularly scheduled progress meeting.

1. Construction Manager will revise Project Construction Schedule immediately after each meeting or other activity where revisions have been recognized or made. Construction Manager will issue updated schedule concurrently with the report of each such meeting.
2. As the Work progresses, Project Construction Schedule will indicate Actual Completion percentage for each activity.
3. The Contractor shall monitor the progress of its work for conformance with the requirements of the construction schedule and shall promptly advise the Construction Manager of any delays or potential delays.
4. If a schedule update is not submitted by the Contractor in a timely fashion, the Contractor shall accept the Project Construction Schedule prepared by the Construction Manager as the construction schedule to be used in carrying out its work and the Contractor waives its rights to claim damage or delay associated with the time requirements set forth in the updated Project Construction Schedule.
5. The Owner reserves the right to adjust the Project Construction Schedule from time to time during construction to mitigate unavoidable problems and ensure that the Project Completion Date is achieved. Contractor shall comply with the adjusted Project Construction Schedule without additional cost.
6. When an updated Project Construction Schedule is produced by the Construction Manager, each Prime Contractor shall signify acceptance of Schedule by signing the schedule.

E. Distribution: Construction Manager will distribute copies of approved schedule to Prime Contractors, Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Construction Manager with a need-to-know schedule responsibility.

1. Construction Manager will post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, Construction Manager will distribute updated schedules to the same parties and post in the same locations. Parties will be deleted from distribution list when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

F. Prime Contractors' Acceptance of Project Construction Schedule: The initial and each updated Project Construction Schedule shall be signed by each Prime Contractor, indicating acceptance of such schedule.

1. A copy of the initial Project Construction Schedule signed and accepted by Prime Contractor shall be attached to the initial Application for Payment. No payment will be processed by the Owner until such document has been received.
2. A copy of the most current Project Construction Schedule signed and accepted by Prime Contractor shall be attached to each succeeding Application for Payment. No payment will be processed by the Owner until such document has been received.

1.8 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within 10 days after Notice of Award of Contract or at the preconstruction meeting, whichever comes first.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 CPM SCHEDULE REQUIREMENTS

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice of Award. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice of Award.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.
b. Preparation and processing of coordination drawings.

c. Mobilization and demobilization.
d. Purchase of materials.
e. Delivery.
f. Fabrication.
g. Utility interruptions.
h. Installation.
i. Work by Owner that may affect or be affected by Contractor's activities.
j. Testing and commissioning.
k. Punch list and final completion.
l. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

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

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.

6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.10 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions.

1.11 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

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

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

END OF SECTION 013200

SECTION 013233 – PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following work by the Contractor:

1. Preconstruction photographs.
2. Preconstruction videos.

1.2 SUBMITTALS

A. Key Plan: Submit key plan of Project site and buildings with notation of vantage points marked for location and direction of each photograph and video. Indicate elevation or story of construction. Include same label information as corresponding set of photographs or video.

B. Photographs: Submit two prints of each photographic view

1. Format: 8-by-10-inch smooth-surface matte prints on single-weight commercial-grade photographic paper, enclosed back to back in clear plastic sleeves that are punched for standard 3-ring binder.
2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:

a. Name of project.
b. Name of Architect and Construction Manager
c. Name of Contractor.
d. Date photograph was taken if not date stamped by camera.
e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
f. Unique sequential identifier.

3. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints as a Project Record Document on CD-ROM. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

C. DVD’s: Submit 2 copies of each DVD with protective sleeve or case within seven days of recording.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name of Architect and Construction Manager.
c. Name of Contractor.
d. Date video was recorded.

e. Description of vantage point, indicating location, direction (by encompass point), and elevation or story of construction.
f. Weather conditions at time of recording.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Photographic Film: Medium format, 2-1/4 by 2-1/4 inches

B. Digital Images: Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1600 by 1200 pixels.

C. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to the Owner.

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 photographs that identifies each photographic location.

B. Film Images:

1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
2. Field Office Prints: Retain one set of prints of photographs in the field office at Project site, available at all times for reference.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in filename for each image.
2. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference.

D. Preconstruction Photographs: Before commencement of demolition, or starting construction, take color and digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Take 20 photographs of each existing building to accurately record physical conditions at start of demolition or construction.

2. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

3.2 CONSTRUCTION DIGITAL VIDEO

A. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video, record weather conditions from local newspaper or television and the actual temperature reading at Project site.

B. Narration: Describe scenes on video by audio narration by microphone while video is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.

1. Confirm date and time at beginning and end of recording.
2. Begin each video with name of Project, Contractor's name, videographer's name, and Project location.

C. Preconstruction Video: Before starting demolition or construction record video of Project site and surrounding properties from different vantage points.

1. Show existing conditions adjacent to Project site before starting the Work.
2. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition, or construction.
3. Show protection efforts by Contractor.

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 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 Requirements:
1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 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. 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.

1.3 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 revisions to submittals noted by 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. All submittals shall be submitted to Architect and Construction Manager within 25 days of contract signing.
3. Allow sufficient processing time; as a minimum, as indicated in this Section.

4. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include all submittals for the project in the initial submittal schedule.
5. Final Submittal Schedule: 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.
6. 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 date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

B. Architect will review Submittal Schedule for concentrations, overloading and similar conflicts which will impact the Architect's ability to meet the schedule and propose revisions to the duration of processing time to the Contractor.

C. No payment will be made to Contractor until complete Schedule of Submittals has been received and accepted by Owner and Architect.

D. 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 if the Contractor fails to submit a Submittal Schedule.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files:
1. Any request for digital data files shall be solely and exclusively for use related to this Project.
2. CAD Background Drawings: Electronic copies of CAD Background Drawings of the Contract Documents in editable file format will be available from the Architect as a convenience to the Contractor for use in preparing shop drawings for this Project. Refer to "Contractor Request for Electronic Drawing Files" attached to the end of this Section for procedures for ordering and transfer of files and for Architect's limitations of liability for transfer.
    a. CAD Background Drawings files requested will be delivered in editable file format indicated, and will not be further altered by the Architect prior to delivering them to any said party.
3. Each contractor requesting electronic data file shall submit a request for Electronic Drawing Files, prior to delivery of said files. No contractor, shall transfer these Electronic Files received from the Architect, or any portion thereof to any third party ("Transferee") without written permission of the Architect.
4. The Architect will transfer files to the requesting entity via the Project Information Management (PIM) software.
5. All files are a schematic representation of elements within the project. All Contractors are responsible for field verification and coordination with other trades.

6. Use of these files does not relieve the Contractor from producing Coordination Drawings and Shop Drawings required by the Contract.

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. Submit product data, shop drawings and samples relating to a complete assembly at one time. Partial submittals will be returned without action.
   5. Interrelated color selections will not be made until all pertinent samples are received by the Architect.
   6. 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 sufficient 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 a minimum of 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Resubmittal Review: Allow a minimum of 15 working days for review of each resubmittal.
   3. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow a minimum of 21 calendar days for initial review of each submittal. Any sequential reviews shall be identified on the Submittal Schedule by the Architect and agreed upon by the Project team.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Place fully executed “Submittal Cover Sheet” attached to the end of this Section as first page of every paper submittal. Complete all required information before submitting to Architect. Submittals received without Submittal Cover Sheet or with incomplete information on cover sheet will be returned for resubmission
   3. Include Contractor's stamp indicating information complies with Contract Document requirements.
   4. Submittals indicating less than complete review by Contractor will be returned for Contractor's compliance without Architect's review.

5. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
6. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form acceptable to Architect and Owner. Architect will return without review submittals received from sources other than Contractor.
    a. Transmit all submittals to Architect with a copy to the Construction Manager unless otherwise indicated.
    b. When submittal requires review of data by Structural Engineer or Mechanical or Electrical Engineers, submit a copy directly to such engineer with a copy to the Architect and the Construction Manager.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Place fully executed “Submittal Cover Sheet” attached to the end of this Section as first page of every electronic submittal. Complete all required information before submitting to Architect. Submittals received without Submittal Cover Sheet or with incomplete information on cover sheet will be returned for resubmission.
3. 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., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner**,** containing the following information:
    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. Names of subcontractor, manufacturer, and supplier.
    g. Category and type of submittal.
    h. Submittal purpose and description.
    i. Specification Section number and title.
    j. Specification paragraph number or drawing designation and generic name for each of multiple items.
    k. Drawing number and detail references, as appropriate.
    l. Location(s) where product is to be installed, as appropriate.
    m. Related physical samples submitted directly.
    n. Indication of full or partial submittal.
    o. Submittal and transmittal distribution record.
    p. Other necessary identification.
    q. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: 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 manner 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.
4. Architect’s Re-review of Submittals: When resubmittals are required due to Contractor’s failure to properly coordinate submittals, including coordination with other Prime Contractors, Contractor shall reimburse the Owner for fees paid to the Architect for re-review of submittals through a credit change order, in accordance with the Architect’s current fee schedule.

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: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.
1. The Contractor shall perform no portion of its work requiring submittal and review of shop drawings, product data, samples or similar submittals until the respective submittal has been approved by the Architect. Such work shall be in accordance with approved submittals.
2. The Contractor shall supply shop drawings to other Contractors engaged by the Owner to perform work in connection with the project to ensure proper coordination of its work with theirs.
3. Do not proceed with installation until an applicable copy of the submittal is in the installer's possession.
4. Do not permit use of unmarked copies of submittals in connection with construction.

K. Project Information Management System: The submittal process will be implemented through the use of a digital processing and tracking software similar to “Submittal Exchange”. Use this Project Information Management (PIM) software to transmit all submittals. Contractors must participate in and become capable in using this system.

1.5 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. All submittals shall be submitted to Architect and Construction Manager within 25 days of contract signing.
1. Post electronic submittals as PDF electronic files directly to Architect’s project information transmission web based software specifically established for Project.
a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit electronic file except where paper copies of submittals are specifically required.
3. Informational Submittals: Submit electronic file except where paper copies of submittals are specifically required.
4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    a. Provide a notarized statement on original paper copy certificates and certifications where indicated.

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. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
3. Mark each copy of each submittal to show which products and options are applicable. Strike extraneous information prior to submittal
4. 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.
5. 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.
6. Submit Product Data before or concurrent with Samples.
7. Submit Product Data in the following format:
    a. PDF electronic file, unless requested by Architect.

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 on Architect's digital data drawing files is otherwise permitted. Standard information prepared without specific reference to the Project is not considered a Shop Drawing. Verify field measurements prior to preparation of shop drawings.
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, unless requested by Architect.
   b. In addition to submission of electronic files, submit 3 paper copies of fire alarm shop drawings and sprinkler shop drawings with Contractor approval stamps applied, for submittal to the AHJ Code Review for review and comment, as required.
   c.

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.
   e. Specification paragraph number and generic name of each item.
3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
5. 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 three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. 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 two Sample sets; remainder will be returned.
   1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
   2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

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 or assigned by Contractor if none is indicated.
   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. Coordination Drawing Submittals: Comply with requirements specified in Section 013115 “Coordination Drawings.”

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 01 7823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research/Evaluation Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

1.6 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
   1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 2 - EXECUTION

2.1 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 Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 7700 "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.

2.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Architect’s Actions:
   1. Contractor may proceed with fabrication on submittals marked "No Exception Taken" or "Make Corrections Noted" provided that the Contractor adheres to the corrections noted.
   2. Contractor may not proceed with fabrication on shop drawings noted "Revise and Resubmit" or "Rejected" until "No Exception Taken" or "Make Corrections Noted" stamp is received on resubmitted drawing.
   3. Contractor may not proceed with fabrication on the specific shop drawings noted "Partial Resubmit" until "No Exception Taken" or "Make Corrections Noted" stamp is received on resubmitted drawing.

4. Do not permit submittals marked "Revise and Resubmit," or "Rejected," to be used at Project site, or elsewhere where Work is in progress.
5. Other Action: Where submittal is primarily for information or record purposes, special processing or other activity, submittal will be returned, marked "No Action Taken."

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.

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 unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

F. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

ATTACHMENTS:
Submittal Cover Sheet
Contractor’s Request for Electronic Drawing

SUBMITTAL COVER SHEET

Contractor:_____

Address:_____ **Telephone:** (__)_____

Owner:

Name of Project:

TYPE OF SUBMITTAL:

☐Shop Drawings ☐Schedule ☐Physical Sample
☐Technical Data ☐Certificate ☐Color Sample
☐Test Report ☐Warranty ☐_____

Submission #: (circle one) **1st 2nd 3rd 4th**

Description:

Product Identification: _____

_____

Manufacturer: _____

Subcontractor/Supplier:_____

DOCUMENT REFERENCES: (Must be fully filled out)

Spec Section No.:_____ Drawing No(s):_____

Paragraph: _____ Rm. Or Det. No(s):_____

Contractor Remarks:

Contractor Submittal Review Stamp

THE ATTACHED MATERIAL HAS BEEN REVIEWED BY THE UNDERSIGNED AND IS BELIEVED TO COMPLY WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE UNDERSIGNED UNDERSTANDS VERIFICATION OF FIELD DIMENSIONS, AND COORDINATION WITH OTHER TRADES, REMAINS THE RESPONSIBILITY OF THE CONTRACTOR.

DATE: _____ BY (SIGN): _____

Consultant use below this line:

Architect Submittal Review Stamp

☐NO EXCEPTIONS ☐MAKE CORRECTIONS NOTED
☐REJECTED ☐REVISE AND RESUBMIT
☐EXAMINED ☐SUBMIT SPECIFIED ITEM

CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY ACTION SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS & SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS WHICH SHALL BE CONFIRMED & CORRELATED AT THE JOB SITE; FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF HIS WORK WITH THAT OF ALL OTHER TRADES & THE SATISFACTORY PERFORMANCE OF HIS WORK

KG+D ARCHITECTS, P.C.

DATE_____ BY_____

CONTRACTOR REQUEST FOR ELECTRONIC DRAWING FILES

The Architect, for the convenience of the Client/Owner, has electronic copies or representations of Drawings, Specifications and Project Manuals. Requests for electronic copies of such Drawings, Specifications and Project Manuals by the Contractor, for the Contractors use or the use of Subcontractors, shall be made in writing to the Client/Owner as outlined hereinbelow and shall outline the benefit derived from such a request. The Contractor shall be prepared to reimburse the Client/Owner for any costs involved in preparing such electronic documents for the Contractors use.

Architect's Project Number:	
Project Name:	
Architect:	
Client/Owner:	
Contractor/Recipient's Name:	
Attention to:	
Contractor/Recipient's Address:	
Date of Request:	
Date of Release:	

As requested, attached is a list of electronic drawing files. For the release of these electronic drawing files to the recipient, the following items shall be understood, acknowledged and signed by the authorized personnel of the recipient with the fee included.

A. The electronic drawing files are the property of the Architect and the Contractor is granted a license to use the electronic files only in connection with the subject project.

B. The electronic drawing files do not necessarily represent the Contract Documents associated with the referenced project. These files are solely for the use of the recipient and are not a representation of the scope of work for the project. Any use by contractors, subcontractors or fabricators shall be on all of the same terms and conditions being applicable to such users who shall acknowledge the same in writing. The Recipient may use the electronic drawing files only. Electronic drawing files or portions thereof, shall not be provided to anyone else without the written approval of the Client/Owner. The use of the electronic drawing files, documents and any reprographics shall not identify any member of the Architect or Architect's consultants or sub-consultants or the Client/Owner without the written approval from the parties.

C. The entire risks as to the results and performance of the package including the electronic drawing files, are assumed by the Contractor/recipient. The Client/Owner, the Architect and the Architect's consultants and sub-consultants, including directors, employees,

representatives, and licensors of the company, shall not have any liability to the Contractor/recipient or any other person or entity for any direct, indirect, incidental special or consequential damages whatsoever, including, but not limited to, the loss of revenue or profit, lost data, or any other personnel, commercial or economic loss, and claims by third parties. Even if the Client/Owner and Architect and the Architect's consultants and sub-consultants has been advised of the possibility of such damages; said Client/Owner and Architect and the Architect's consultants and sub-consultants shall not be held liable as stated above.

D. The Contractor/recipient hereby agrees to indemnify and hold the Client/Owner, the Architect and the Architect's consultants and sub-consultants harmless from and against any cost, damage, liability, loss or claim arising from violation of this license. The Contractor/recipient and all subcontractors of all tiers also agrees that, in addition to all other remedies hereunder, the Contractor/recipient and such parties grant the Client/Owner the right to seek injunctive or other equitable relief to prevent the violation or require the performance of any of the Contractor's/recipient's obligations under this license, and the Contractor/recipient hereby consents to the issuance of such relief by any court of competent jurisdiction without the need to post any bond or security.

E. The electronic files requested are as follows:

Electronic file name	Corresponding Drawing (close approximation)
1.	
2.	
3.	
Etc.	
Total number of files:	

CONTRACTOR'S/RECIPIENT'S AGENT SIGNATURE: _____

NAME IN BLOCK LETTERS: _____

AUTHORIZED POSITION HELD: _____

DATE OF SIGNATURE: _____

End of Attachment

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.
   1. This Section does not include requirements for performing Special Inspections and Tests in compliance with Chapter 17 of the Building Code of New York State; refer to Section 014100.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Owner.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

J. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
   1. Mockups are used for one or more of the following:
      a. Verify selections made under Sample submittals.
      b. Demonstrate aesthetic effects.
      c. Demonstrate the qualities of products and workmanship.
      d. Demonstrate successful installation of interfaces between components and systems.
      e. Perform preconstruction testing to determine system performance.
   2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
   3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

1.3 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data For Contractor's quality-control personnel.

B. Contractor's Statement of Responsibility: Submit copy of written statement of responsibility, acknowledging awareness of the special requirements contained in the Statement of Special Inspection, to authorities having jurisdiction before starting work on the following systems:
1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspection.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspection.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
2. Project title and number.

3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, an agency accredited by the International Accreditation Service, Inc. or an equivalent accreditation agency accrediting in accordance with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
f. When testing is complete, remove test specimens, assemblies; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, Construction Manager and Owner's Commissioning Authority, through Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect and Construction Manager minimum seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
a. Allow minimum seven days for initial review and each re-review of each mockup.
7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed or incorporate approved in-place mock-ups in the finished work, as specifically instructed in each specification section where a mock-up is required.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

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

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. 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.

F. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Construction Manager and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. 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.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.9 SPECIAL INSPECTIONS

A. Special Inspections: Owner will engage qualified testing agency(ies) and special inspectors to conduct special inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Division 01 Section “Special Inspections and Tests”.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager’s reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section “Cutting and Patching.”

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014100 - SPECIAL INSPECTIONS AND TESTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for performing Special Inspections and Tests in accordance with requirements of Chapter 17 of the *Building Code of New York State* (BCNYS). Testing and inspecting services are required to verify compliance with requirements specified or indicated in the contract documents. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1.2 DEFINITIONS

A. Registered Design Professional: The Registered Architect whose seal appears on the Construction Drawings.

B. Testing/Inspecting Agency: An agent retained by the Owner and coordinated by the Special Inspector, to perform some of the testing and/or inspection services on behalf of the Special Inspector. (An example of an Inspecting Agency would be a Geotechnical Engineer).

C. Statement of Special Inspections: A document prepared by the Registered Design Professional that includes the Schedule of Special Inspections listing the materials and work requiring Special Inspections. A copy of this document is included at the end of this Section.

D. Continuous Special Inspection: The full-time observation of work requiring Special Inspections by the Special Inspector who is present in the area where the work is being performed.

E. Periodic Special Inspections: The part-time or intermittent observation of work requiring Special Inspections by the Special Inspector who is present in the area where the work has been or is being performed and at the completion of the work

1.3 CONTRACTOR RESPONSIBILITIES

A. Contractor shall cooperate with the Special Inspector and his agents so that Special Inspections and testing may be performed without hindrance.

B. Contractor shall notify the Special Inspector and/or Testing/Inspecting Agency at least 48 hours in advance of a required inspection or test. Contractor shall coordinate sequence of activities to accommodate required inspection and testing 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.

C. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.

D. The Contractor shall keep at the project site the latest set of Construction Drawings, field sketches, accepted shop drawings, and specifications for field use by the Inspectors and Testing Technicians.

E. The Special Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program.

1.4 QUALITY CONTROL

A. Construction Manager will hold a Special Inspections preconstruction meeting at least 7 days prior to the initial planned date for start of construction.

1. Discussion shall include review of specifications and Schedule of Special Inspections for work requiring Special Inspections; responsibilities of Contractor, Owner, Testing Agency, Special Inspector, and Registered Design Professional; notification procedures; and reporting procedures.
2. Attendees shall include the Contractor, Owner’s representative, Testing Agency, Special Inspector, and Registered Design Professionals for Structural Engineering and for Architecture.

1.5 LIMITS ON AUTHORITY

A. The Special Inspector or Testing/Inspecting Agency shall not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Special Inspector or Testing/Inspecting Agency shall not have control over the Contractor’s means and methods of construction.

C. The Special Inspector or Testing/Inspecting Agency shall not be responsible for construction site safety.

D. The Special Inspector or Testing/Inspecting Agency shall not have the authority to stop the work.

1.6 STATEMENT OF SPECIAL INSPECTIONS

A. The Statement of Special Inspections and Tests, on the form included at the end of this Section, will be prepared by the Registered Design Professional.

B. Required inspections and tests are described in the Schedule of Special Inspections and Tests attached to the end of this Section and in the individual specification sections for the items to be inspected or tested .

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used).

END OF SECTION 014100
ATTACHMENTS
SPECIAL INSPECTION NON-CONFORMANCE REPORT FORM
NYSED STATEMENT OF SPECIAL INSPECTIONS AND TESTS

SPECIAL INSPECTION NON-CONFORMANCE REPORT NO.

DATE:
TO: Registered Design Professional (RDP)
KG+D Architects, PC
285 Main St., Mount Kisco, NY 10549

CC: Contractor:

FROM: _____, Special Inspector

PROJECT: District-Wide Capital Improvements - High School & Middle School HVAC Upgrades

PART I: REFERENCE SPECIAL INSPECTION REPORT NO. _____.
(Attach copy of report.)

DESCRIPTION OF NON-CONFORMANCE:

RDP RESPONSE: (PROVIDE ATTACHMENTS IF NECESSARY)

RDP SIGNATURE _____ DATE_____

IS REINSPECTION BY SPECIAL INSPECTOR REQUIRED ☐YES ☐NO

PART II: CONTRACTOR VERIFICATION (To be completed by either the ***[General Contractor or Construction Manager]*** or Subcontractor and returned to the Special Inspector and the RDP.)

I verify that as of the date listed, the non-conforming item noted above has been corrected as required.
SIGNATURE _____ DATE_____

NYS EDUCATION DEPARTMENT Office of Facilities Planning 89 Washington Avenue, Room 1060 EBA Albany, NY 12234	STATEMENT OF SPECIAL INSPECTIONS AND TESTS As required by the Building Code of NYS (2020 BCNYS) *Note: The code listings below are not to be considered all inclusive.*

BCNYS § 1704.2.3 requires the NYS Licensed Design Professional (of record) to complete the Statement of Special Inspections and Tests. Completion of the Statement of Special Inspections & Tests, **and;** Submission to the Office of Facilities Planning with the Construction Permit Application is a condition for issuance of the Building Permit.

School District	Project Title
Chappaqua CSD	District-Wide Capital Improvements - Middle Schools
Building	
Robert E. Bell Middle School	
SED Project #	**Project Address**
661004-06-0009-025	50 Senter Street, Chappaqua, NY 10514

Architect/Engineer: Stephen Lehigh, PE

Sign and Stamp: STATE OF NEW YORK · STEPHEN LEHIGH · 094679 · LICENSED PROFESSIONAL ENGINEER

Exp. 9/30/206
CA# 020252

A/E Firm (or Dba): The Di Salvo Engineering Group, P.C.	Phone (203) 490-4140	Date 9/27/2023

Comments:

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction				**Ch. 22**		
1. Material verification of high-strength bolts, nuts and washers.		x	AISC 360	1705.2 2204	☑	051200
2. Inspection of high-strength bolting.	x	x	AISC 360 ACI 318	1705.2 2204.2	☑	051200
3. Material verification of **Structural Steel. Open Web Steel Joist and Girders.** Basic protection of steel members, **Seismic Resistance**			AISC 360 ASTM A6, A514, A29 SJ100, 200 AICS 341	1705.2 2203, 2205 1705.2 2207	☑ ☐ ☐	051200
4. Spray Applied Fire Resistant Materials & Specialized Finishes			ASTM E605, E736	1705.14 1705.15	☐	
5. **Cold Formed Steel Construction**- load bearing. **Seismic Resistance**			AISI S100, S220, S240 ANSI/SDI -NC1.0, RD1.0, SDI-C, ASCE 7, 8 AISI S400	1704.2.5 2210 2211	☐ ☐	
6. Material verification of weld filler materials.			AWS D1.1, D1.3	1705.2 2204.1	☑	051200
7. Inspection of welding:			ACI 318: 26.6.4	T 1705.3 2204	☑	051200
a. Structural steel	x	x	AWS D1.1, D1.3	1705.2	☑	051200
b. Reinforcing steel	x	x	AWS D1.1, D1.3	1705.3.1	☐	
c. Cold Formed Steel Deck			AISC S100, ASCE 7, 8	1705.2.2	☐	
8. Inspection of steel frame joint details.		x		1705.2	☐	

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
B.	**Concrete Construction**				**Ch. 19**		
1.	Inspection of reinforcing steel, including prestressing tendons, and verify placement.		x	Ch. 21, 22 ACI 318; Ch 20, 25.2, 25.3, 26.6.1, 26.6.3 AISC 360	T 1705.3 1901 1905	☐	
2.	Inspection of reinforcing steel bar welding.			ACI 318, AWS D1.4	T 1705.3	☐	
3.	Inspection of anchors to be installed in concrete prior to and during placement.	x		ACI 318: 17.8.2, 17.8.2.4	T 1705.3	☐	
4.	Verify use of required design mix.		x	ACI 318: Ch. 19, 26.4.3, 26.4.4	T 1705.3 1904 1908	☐	
5.	Sampling fresh concrete: slump, air content, temperature, strength test specimens.	x		ASTM C172, C31 ACI 318: 26.5, 26.9, 26.10, 26.11	T 1705.3 1901 1905 1908	☐	
6.	Inspection of placement for proper application techniques.	x		ACI 318: 26.5	T 1705.3	☐	
7.	Inspection for maintenance of specified curing temperature and techniques.		x	ACI 318: 26.5	T 1705.3 1908 1909	☐	
8.	Inspection of prestressed concrete.	x		ACI 318: 26.10	T 1705.3	☐	
9.	Erection of precast concrete members.		x	ACI 318: 26.9	T 1705.3	☐	
10.	Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		x	ACI 318: 26.11.2	T 1705.3	☐	
11	Inspection of formwork		x	ACI 318: 26.11.1.2 (b)	T 1705.3	☐	

C. Masonry Construction					Ch. 21		
INSPECTION AND TESTING **Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17** **All reports to be submitted to the owners representative for use, approval and record.**	**CONTINUOUS**	**PERIODIC**	**REFERENCE STANDARD**		**BCNYS REFERENCE**	**CHECK IF REQUIRED**	**IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY**
L1 = Level 1 Inspection required for nonessential facilities. **L2** = Level 2 Inspection required for essential facilities. * In general, schools are not considered essential facilities unless they are a designated emergency shelter.			ASTM E119 UL 263 ASTM C1364 ASTM C1670 ASTM A706 ASCE 7, 8	TMS 402, 403, 404, 504, 602	1705.4 2101 1604		
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		X L1 & L2			1705.4 2103.2	☐	
b. Placement of masonry units and construction of mortar joints.		X L1 & L2			1705.4 T 1705.3	☐	
c. Location and placement of reinforcement, connectors, tendons, anchorages.		X L1 & L2			1705.45 2103.4 T 1705.3	☐	
d. Prestressing technique.		X L1			1705.4	☐	
Grout space prior to grouting.	X L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		X L1			1705.4	☐	
Placement of grout.	X L2				1705.4	☐	
f. Grout specs prior to grouting.	X L2				1705.4	☐	
2. Inspection program shall verify:							
a. Size and location of structural elements.		X L1 & L2			1704.5 1705.4	☐	
b. Type, size, and location of anchors.	X L2	X L1			1705.4 T 1705.3	☐	
c. Specified size, grade, and type of reinforcement.		X L1 & L2			1704.5	☐	
d. Welding of reinforcing bars.	X L1 & L2				1704.5	☐	
e. Cold/hot weather protection of masonry construction.		X L1 & L2			1704.5, 2104.3, 2104.4	☐	
f. Prestressing force measurement and application.	X L2	X L1			1704.5	☐	
3. Verification accessory placement prior to grouting:	X L2	X L1			1704.5, 2105.2.2, 2105.3	☐	
4. Grout placement.	X L1				1704.5	☐	
5. Preparation of grout specimens, mortar specimens, and/or prisms.	X L1 & L2				1704.5, 2105.2.2, 2105.3	☐	
6. Compliance with documents and submittals.		X L1 & L2			1704.5	☐	

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
D. Wood Construction				**Ch. 23**		
1. Fabrication process of prefabricated **Wood Structural Elements** and assemblies.		x	Ch. 16 AWC, APA, CPA, DOC PS1, PS2	1704.6, 1705.5 2302, 2303 2304	☐	
2. High-load diaphrams **Seismic Resistance**		x		1704, 1705, 1704.6 2304, 2305 2306, 2307, 2308	☐	
E. Soils				**Ch. 18**		
1. Geotechnical Investigations, Excavations, Grading, Fill Damp-proofing/ Water-Proofing		x	ASTM, NYS DOT OSHA Appendix J- BCNYS	1704, 1706 1803, 1804, 1805	☐	
2. **Flood & Stormwater Hazards** [per BCNYS 106]		x	Local Highway Authority Flood Plain Admin. Appendix G- BCNYS	1703 1610, 1611, 1612 1805.1.2.1	☐ ☐	
F. Specialized Foundations- Piers, Piles				**Ch. 16**		
1. Deep Foundation Elements: Driven Piles Cast in Place Helical Piles		x		T 1705.7 T 1705.8 1705.7 1705.8 1705.9	☐	
G. Exterior Wall Coverings				**Ch. 14**		
1. Exterior Insulation and Finish Systems (EIFS) MCM, HPL, Other Combustible Materials		x	ASTM E2568, E2273, E2570 E2393, E84 Ch. 16 NFPA 268, 275, 285, 286	1405, 1406, 1407, 1408 1704.2, 1705.12.5 1705.16	☐	
H. Misc.						
1. Access Floors and Storage Racks Other Architectural, MEP Components **Seismic Resitance**		x		1705.12	☐	
2. In-Situ Testing		x		1604.6, 1708	☐	
3. Pre-Construction Load Testing		x		1604.7, 1709	☐	
4. Fire Resistant Penitrations & Joints Fire Stops Testing for Smoke Control		x	Ch. 7 ASTM E119 UL 263	1705.17 1705.18	☐	
5. **Pre-Submission:** **Inventory of all Fire-Resistant-Rated Construction- Level 2 Alterations and greater** [per BCNYS 106]	x		verification required EBCNYS Ch. 3 C. of E. 155 Regulations.	**FCNYS 701.6** **BCNYS 703.7** **19CRR-NY XXXII**	☐	
6. **Pre-Submission:** **Hazardous Material Survey** **Water Quality Survey**	x x		verification required ACM Letter- Certificate C. of E. 155 Regulations.	US-EPA NYS-DOH	☐	
7. Other:					☐	

NYS EDUCATION DEPARTMENT Office of Facilities Planning 89 Washington Avenue, Room 1060 EBA Albany, NY 12234	STATEMENT OF SPECIAL INSPECTIONS AND TESTS As required by the Building Code of NYS (2020 BCNYS) *Note: The code listings below are not to be considered all inclusive.*

BCNYS § 1704.2.3 requires the NYS Licensed Design Professional (of record) to complete the Statement of Special Inspections and Tests. Completion of the Statement of Special Inspections & Tests, **and;** Submission to the Office of Facilities Planning with the Construction Permit Application is a condition for issuance of the Building Permit.

School District	Project Title
Chappaqua CSD	District-Wide Capital Improvements

Building

Seven Bridges Middle School

SED Project #	Project Address
661004-06-0036-007	222 Seven Bridges Road, Chappaqua, NY 10514

Architect/Engineer: Stephen Lehigh, PE

Sign and Stamp:

STATE OF NEW YORK · STEPHEN LEHIGH · 094679 · LICENSED PROFESSIONAL ENGINEER

Exp. 9/30/206
CA# 020252

A/E Firm (or Dba): The Di Salvo Engineering Group, P.C.	Phone (203) 490-4140	Date 9/27/2023

Comments:

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A.	**Steel Construction**				**Ch. 22**		
1.	Material verification of high-strength bolts, nuts and washers.		x	AISC 360	1705.2 2204	☑	051200
2.	Inspection of high-strength bolting.	x	x	AISC 360 ACI 318	1705.2 2204.2	☑	051200
3.	Material verification of **Structural Steel. Open Web Steel Joist and Girders.** Basic protection of steel members, **Seismic Resistance**			AISC 360 ASTM A6, A514, A29 SJ100, 200 AICS 341	1705.2 2203, 2205 1705.2 2207	☑ ☐ ☐	051200
4.	Spray Applied Fire Resistant Materials & Specialized Finishes			ASTM E605, E736	1705.14 1705.15	☐	
5.	**Cold Formed Steel Construction**- load bearing. **Seismic Resistance**			AISI S100, S220, S240 ANSI/SDI -NC1.0, RD1.0, SDI-C, ASCE 7, 8 AISI S400	1704.2.5 2210 2211	☐ ☐	
6.	Material verification of weld filler materials.			AWS D1.1, D1.3	1705.2 2204.1	☑	051200
7.	Inspection of welding:			ACI 318: 26.6.4	T 1705.3 2204	☑	051200
	a. Structural steel	x	x	AWS D1.1, D1.3	1705.2	☑	051200
	b. Reinforcing steel	x	x	AWS D1.1, D1.3	1705.3.1	☐	
	c. Cold Formed Steel Deck			AISC S100, ASCE 7, 8	1705.2.2	☐	
8.	Inspection of steel frame joint details.		x		1705.2	☐	

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
B.	**Concrete Construction**				**Ch. 19**		
1.	Inspection of reinforcing steel, including prestressing tendons, and verify placement.		x	Ch. 21, 22 ACI 318; Ch 20, 25.2, 25.3, 26.6.1, 26.6.3 AISC 360	T 1705.3 1901 1905	☐	
2.	Inspection of reinforcing steel bar welding.			ACI 318, AWS D1.4	T 1705.3	☐	
3.	Inspection of anchors to be installed in concrete prior to and during placement.	x		ACI 318: 17.8.2, 17.8.2.4	T 1705.3	☐	
4.	Verify use of required design mix.		x	ACI 318: Ch. 19, 26.4.3, 26.4.4	T 1705.3 1904 1908	☐	
5.	Sampling fresh concrete: slump, air content, temperature, strength test specimens.	x		ASTM C172, C31 ACI 318: 26.5, 26.9, 26.10, 26.11	T 1705.3 1901 1905 1908	☐	
6.	Inspection of placement for proper application techniques.	x		ACI 318: 26.5	T 1705.3	☐	
7.	Inspection for maintenance of specified curing temperature and techniques.		x	ACI 318: 26.5	T 1705.3 1908 1909	☐	
8.	Inspection of prestressed concrete.	x		ACI 318: 26.10	T 1705.3	☐	
9.	Erection of precast concrete members.		x	ACI 318: 26.9	T 1705.3	☐	
10.	Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		x	ACI 318: 26.11.2	T 1705.3	☐	
11	Inspection of formwork		x	ACI 318: 26.11.1.2 (b)	T 1705.3	☐	

C. Masonry Construction						Ch. 21
INSPECTION AND TESTING **Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17** **All reports to be submitted to the owners representative for use, approval and record.**	**CONTINUOUS**	**PERIODIC**	**REFERENCE STANDARD**		**BCNYS REFERENCE**	**CHECK IF REQUIRED**	**IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY**
L1 = Level 1 Inspection required for nonessential facilities. **L2 =** Level 2 Inspection required for essential facilities. * In general, schools are not considered essential facilities unless they are a designated emergency shelter.			ASTM E119 UL 263 ASTM C1364 ASTM C1670 ASTM A706 ASCE 7, 8	TMS 402, 403, 404, 504, 602	1705.4 2101 1604		
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		X L1 & L2			1705.4 2103.2	☐	
b. Placement of masonry units and construction of mortar joints.		X L1 & L2			1705.4 T 1705.3	☐	
c. Location and placement of reinforcement, connectors, tendons, anchorages.		X L1 & L2			1705.45 2103.4 T 1705.3	☐	
d. Prestressing technique.		X L1			1705.4	☐	
Grout space prior to grouting.	X L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		X L1			1705.4	☐	
Placement of grout.	X L2				1705.4	☐	
f. Grout specs prior to grouting.	X L2				1705.4	☐	
2. Inspection program shall verify:							
a. Size and location of structural elements.		X L1 & L2			1704.5 1705.4	☐	
b. Type, size, and location of anchors.	X L2	X L1			1705.4 T 1705.3	☐	
c. Specified size, grade, and type of reinforcement.		X L1 & L2			1704.5	☐	
d. Welding of reinforcing bars.	X L1 & L2				1704.5	☐	
e. Cold/hot weather protection of masonry construction.		X L1 & L2			1704.5, 2104.3, 2104.4	☐	
f. Prestressing force measurement and application.	X L2	X L1			1704.5	☐	
3. Verification accessory placement prior to grouting:	X L2	X L1			1704.5, 2105.2.2, 2105.3	☐	
4. Grout placement.	X L1				1704.5	☐	
5. Preparation of grout specimens, mortar specimens, and/or prisms.	X L1 & L2				1704.5, 2105.2.2, 2105.3	☐	
6. Compliance with documents and submittals.		X L1 & L2			1704.5	☐	

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D. Wood Construction				**Ch. 23**		
1. Fabrication process of prefabricated **Wood Structural Elements** and assemblies.		x	Ch. 16 AWC, APA, CPA, DOC PS1, PS2	1704.6, 1705.5 2302, 2303 2304	☐	
2. High-load diaphrams **Seismic Resistance**		x		1704, 1705, 1704.6 2304, 2305 2306, 2307, 2308	☐	
E. Soils				**Ch. 18**		
1. Geotechnical Investigations, Excavations, Grading, Fill Damp-proofing/ Water-Proofing		x	ASTM, NYS DOT OSHA Appendix J- BCNYS	1704, 1706 1803, 1804, 1805	☐	
2. **Flood & Stormwater Hazards** [per BCNYS 106]		x	Local Highway Authority Flood Plain Admin. Appendix G- BCNYS	1703 1610, 1611, 1612 1805.1.2.1	☐ ☐	
F. Specialized Foundations- Piers, Piles				**Ch. 16**		
1. Deep Foundation Elements: Driven Piles Cast in Place Helical Piles		x		T 1705.7 T 1705.8 1705.7 1705.8 1705.9	☐	
G. Exterior Wall Coverings				**Ch. 14**		
1. Exterior Insulation and Finish Systems (EIFS) MCM, HPL, Other Combustible Materials		x	ASTM E2568, E2273, E2570 E2393, E84 Ch. 16 NFPA 268, 275, 285, 286	1405, 1406, 1407, 1408 1704.2, 1705.12.5 1705.16	☐	
H. Misc.						
1. Access Floors and Storage Racks Other Architectural, MEP Components **Seismic Resitance**		x		1705.12	☐	
2. In-Situ Testing		x		1604.6, 1708	☐	
3. Pre-Construction Load Testing		x		1604.7, 1709	☐	
4. Fire Resistant Penitrations & Joints Fire Stops Testing for Smoke Control		x	Ch. 7 ASTM E119 UL 263	1705.17 1705.18	☐	
5. **Pre-Submission:** **Inventory of all Fire-Resistant-Rated Construction- Level 2 Alterations and greater** [per BCNYS 106]	x		verification required EBCNYS Ch. 3 C. of E. 155 Regulations.	**FCNYS 701.6** **BCNYS 703.7** **19CRR-NY XXXII**	☐	
6. **Pre-Submission:** **Hazardous Material Survey** **Water Quality Survey**	x x		verification required ACM Letter- Certificate C. of E. 155 Regulations.	US-EPA NYS-DOH	☐	
7. Other:					☐	

NYS EDUCATION DEPARTMENT Office of Facilities Planning 89 Washington Avenue, Room 1060 EBA Albany, NY 12234	STATEMENT OF SPECIAL INSPECTIONS AND TESTS As required by the Building Code of NYS (2020 BCNYS) *Note: The code listings below are not to be considered all inclusive.*

BCNYS § 1704.2.3 requires the NYS Licensed Design Professional (of record) to complete the Statement of Special Inspections and Tests. Completion of the Statement of Special Inspections & Tests, **and;** Submission to the Office of Facilities Planning with the Construction Permit Application is a condition for issuance of the Building Permit.

School District	Project Title:
Chappaqua CSD	District-Wide Capital Improvements - High School
Building Horace Greeley High School	
SED Project # 661004-06-0015-023	Project Address 70 Roaring Brook Road, Chappaqua, NY 10514
Architect/Engineer: Stephen Lehigh, P.E.	

Sign and Stamp

STATE OF NEW YORK
STEPHEN LEHIGH
094679
LICENSED PROFESSIONAL ENGINEER

Exp. 9/30/2026
CA# 020252

A/E Firm (or Dba):	Phone	Date
The Di Salvo Engineering Group, P.C.	(203) 490-4140	10/23/2023

Comments:

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction				**Ch. 22**		
1. Material verification of high-strength bolts, nuts and washers.		x	AISC 360	1705.2 2204	☑	051200
2. Inspection of high-strength bolting.	x	x	AISC 360 ACI 318	1705.2 2204.2	☑	051200
3. Material verification of **Structural Steel. Open Web Steel Joist and Girders.** Basic protection of steel members, **Seismic Resistance**			AISC 360 ASTM A6, A514, A29 SJ100, 200 AICS 341	1705.2 2203, 2205 1705.2 2207	☑ ☐ ☐	051200
4. Spray Applied Fire Resistant Materials & Specialized Finishes			ASTM E605, E736	1705.14 1705.15	☐	
5. **Cold Formed Steel Construction**- load bearing. **Seismic Resistance**			AISI S100, S220, S240 ANSI/SDI -NC1.0, RD1.0, SDI-C, ASCE 7, 8 AISI S400	1704.2.5 2210 2211	☐ ☐	
6. Material verification of weld filler materials.			AWS D1.1, D1.3	1705.2 2204.1	☑	051200
7. Inspection of welding:			ACI 318: 26.6.4	T 1705.3 2204	☑	051200
a. Structural steel	x	x	AWS D1.1, D1.3	1705.2	☑	051200
b. Reinforcing steel	x	x	AWS D1.1, D1.3	1705.3.1	☐	
c. Cold Formed Steel Deck			AISC S100, ASCE 7, 8	1705.2.2	☐	
8. Inspection of steel frame joint details.		x		1705.2	☑	051200

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
B. Concrete Construction				**Ch. 19**		
1. Inspection of reinforcing steel, including prestressing tendons, and verify placement.		x	Ch. 21, 22 ACI 318; Ch 20, 25.2, 25.3, 26.6.1, 26.6.3 AISC 360	T 1705.3 1901 1905	☑	032000
2. Inspection of reinforcing steel bar welding.			ACI 318, AWS D1.4	T 1705.3	☐	Not Permitted
3. Inspection of anchors to be installed in concrete prior to and during placement.	x		ACI 318: 17.8.2, 17.8.2.4	T 1705.3	☑	033000
4. Verify use of required design mix.		x	ACI 318: Ch. 19, 26.4.3, 26.4.4	T 1705.3 1904 1908	☑	033000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	x		ASTM C172, C31 ACI 318: 26.5, 26.9, 26.10, 26.11	T 1705.3 1901 1905 1908	☑	033000
6. Inspection of placement for proper application techniques.	x		ACI 318: 26.5	T 1705.3	☑	033000
7. Inspection for maintenance of specified curing temperature and techniques.		x	ACI 318: 26.5	T 1705.3 1908 1909	☑	033000
8. Inspection of prestressed concrete.	x		ACI 318: 26.10	T 1705.3	☐	
9. Erection of precast concrete members.		x	ACI 318: 26.9	T 1705.3	☑	34100
10. Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		x	ACI 318: 26.11.2	T 1705.3	☐	
11 Inspection of formwork		x	ACI 318: 26.11.1.2 (b)	T 1705.3	☑	33000

C. Masonry Construction						Ch. 21
INSPECTION AND TESTING **Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17** **All reports to be submitted to the owners representative for use, approval and record.**	**CONTINUOUS**	**PERIODIC**	**REFERENCE STANDARD**		**BCNYS REFERENCE**	**CHECK IF REQUIRED**	**IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY**
L1 = Level 1 Inspection required for nonessential facilities. **L2 =** Level 2 Inspection required for essential facilities. * In general, schools are not considered essential facilities unless they are a designated emergency shelter.			ASTM E119 UL 263 ASTM C1364 ASTM C1670 ASTM A706 ASCE 7, 8	TMS 402, 403, 404, 504, 602	1705.4 2101 1604		
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		X L1 & L2			1705.4 2103.2	☐	
b. Placement of masonry units and construction of mortar joints.		X L1 & L2			1705.4 T 1705.3	☐	
c. Location and placement of reinforcement, connectors, tendons, anchorages.		X L1 & L2			1705.45 2103.4 T 1705.3	☐	
d. Prestressing technique.		X L1			1705.4	☐	
Grout space prior to grouting.	X L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		X L1			1705.4	☐	
Placement of grout.	X L2				1705.4	☐	
f. Grout specs prior to grouting.	X L2				1705.4	☐	
2. Inspection program shall verify:							
a. Size and location of structural elements.		X L1 & L2			1704.5 1705.4	☐	
b. Type, size, and location of anchors.	X L2	X L1			1705.4 T 1705.3	☐	
c. Specified size, grade, and type of reinforcement.		X L1 & L2			1704.5	☐	
d. Welding of reinforcing bars.	X L1 & L2				1704.5	☐	
e. Cold/hot weather protection of masonry construction.		X L1 & L2			1704.5, 2104.3, 2104.4	☐	
f. Prestressing force measurement and application.	X L2	X L1			1704.5	☐	
3. Verification accessory placement prior to grouting:	X L2	X L1			1704.5, 2105.2.2, 2105.3	☐	
4. Grout placement.	X L1				1704.5	☐	
5. Preparation of grout specimens, mortar specimens, and/or prisms.	X L1 & L2				1704.5, 2105.2.2, 2105.3	☐	
6. Compliance with documents and submittals.		X L1 & L2			1704.5	☐	

INSPECTION AND TESTING Continuous & Periodic is as Defined by the BCNYS- CHAPTER 17 All reports to be submitted to the owners representative for use, approval and record.	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
D. Wood Construction				**Ch. 23**		
1. Fabrication process of prefabricated **Wood Structural Elements** and assemblies.		x	Ch. 16 AWC, APA, CPA, DOC PS1, PS2	1704.6, 1705.5 2302, 2303 2304	☐	
2. High-load diaphrams **Seismic Resistance**		x		1704, 1705, 1704.6 2304, 2305 2306, 2307, 2308	☐	
E. Soils				**Ch. 18**		
1. Geotechnical Investigations, Excavations, Grading, Fill Damp-proofing/ Water-Proofing		x	ASTM, NYS DOT OSHA Appendix J- BCNYS	1704, 1706 1803, 1804, 1805	☑	Geotechnical Report
2. **Flood & Stormwater Hazards** [per BCNYS 106]		x	Local Highway Authority Flood Plain Admin. Appendix G- BCNYS	1703 1610, 1611, 1612 1805.1.2.1	☐ ☐	
F. Specialized Foundations- Piers, Piles				**Ch. 16**		
1. Deep Foundation Elements: Driven Piles Cast in Place Helical Piles		x		T 1705.7 T 1705.8 1705.7 1705.8 1705.9	☐	
G. Exterior Wall Coverings				**Ch. 14**		
1. Exterior Insulation and Finish Systems (EIFS) MCM, HPL, Other Combustible Materials		x	ASTM E2568, E2273, E2570 E2393, E84 Ch. 16 NFPA 268, 275, 285, 286	1405, 1406, 1407, 1408 1704.2, 1705.12.5 1705.16	☐	
H. Misc.						
1. Access Floors and Storage Racks Other Architectural, MEP Components **Seismic Resitance**		x		1705.12	☐	
2. In-Situ Testing		x		1604.6, 1708	☐	
3. Pre-Construction Load Testing		x		1604.7, 1709	☐	
4. Fire Resistant Penitrations & Joints Fire Stops Testing for Smoke Control		x	Ch. 7 ASTM E119 UL 263	1705.17 1705.18	☐	
5. **Pre-Submission:** **Inventory of all Fire-Resistant-Rated Construction- Level 2 Alterations and greater** [per BCNYS 106]	x		verification required EBCNYS Ch. 3 C. of E. 155 Regulations.	**FCNYS 701.6** **BCNYS 703.7** **19CRR-NY XXXII**	☐	
6. **Pre-Submission:** **Hazardous Material Survey** **Water Quality Survey**	x x		verification required ACM Letter- Certificate C. of E. 155 Regulations.	US-EPA NYS-DOH	☐	
7. Other:					☐	

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Refer to Site Logistics Drawing for each of the three schools, which follow Section 011000, for additional requirements.

C. Refer to “Multiple Prime Contractor Coordination Chart” attached to Section 011000 for additional requirements relating to temporary facilities and controls.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, Construction Manager, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. HVAC system isolation schematic drawing.
2. Location of proposed air-filtration system discharge.
3. Waste handling procedures.
4. Other dust-control measures.

1.4 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.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Provide the following:

1. General Construction contractor shall provide a field trailer for all separate Prime Contractors' use at the High School.

B. Common-Use Field Offices: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 15 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and tack and marker boards.
3. Drinking water.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).

5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
6. Electrical Contractor shall provide electric hook-ups for and temporary electric power service to field trailer.

C. 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.
2. Each Prime Contractor may have one storage trailer at each school.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

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 campus system.

C. Water Service: Connect to Owner's existing water service source. Install water service distribution piping in sizes and pressures adequate for construction. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Toilets: Use of Owner's existing toilet facilities will not be permitted

2. General Contractor shall provide temporary toilets for the use of all Prime Contractors.

E. Electric Power Service: Connect temporary service to Owner's existing power source, as directed by Owner. Provide separate metering. Provide electric power service distribution system of sufficient size, capacity, and power characteristics required for construction operations.

F. 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.

G. Telephone Service: Provide telephone service for field office. If land-line telephone service is desired, arrange with Owner to have this service installed. Cost of installation and use of temporary telephone land-line service shall be borne by Contractor.

1. Post a list of important telephone numbers in the field office including:

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone for use when away from field office.

H. Electronic Communication Service:

1. Internet Service: Contractor may not connect to the Owner’s data network. Cost of the connection shall be borne by the Contractor.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Use Owner designated areas of existing parking lots for construction personnel.

C. Temporary Use of Permanent Roads and Paved Areas: Limit use of existing roads on school campus to those designated by Owner as assigned construction route. Maintain roads in clean dust-free and dirt-free condition; clean roads of mud and debris caused by construction traffic.

D. Traffic Controls: Provide traffic control signage of type approved by Owner to direct traffic at and around construction site. 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.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide construction signs as indicated and as required to inform public and individuals seeking entrance to Project.
   a. Provide temporary, directional signs for construction personnel and visitors.

2. Maintain and touchup signs so they are legible at all times

G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

1. Each Prime Contractor shall provide their own dumpster.

H. 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.

I. Temporary Elevator Use: Not permitted.

J. Temporary Stairs: Provide temporary stairs where ladders are not adequate.

K. Temporary Use of Permanent Stairs: Use of existing interior stairs for construction traffic will be permitted, as long as the stair is protected. Coordinate with Owner for designated stair for construction purposes.

L. Scaffolding: Provide scaffolding systems and/or lifts as required for the performance of the Work. Scaffolding shall not damage or scar building façade in any way.

M. Cranes: All crane picks, material delivery, etc. must be coordinated so as not to lift over any occupied area of the building. If necessary, this work shall be done on off hours to ensure the safety of the building occupants. Crane location must be carefully chosen to ensure the safety of building occupants. Crane picks cannot be conducted during academic hours within 30' of an occupied building.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of Erosion and Sediment Control Drawings and specification in Division 31.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

3. Fencing shall be 6’ tall chain link fence with gates and privacy screening.
4. General Contractor shall provide all temporary fencing at High School.

G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

J. 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 needed and permanent enclosure is incomplete, insulate temporary enclosures.
2. Provide weatherproof, secure temporary enclosures for all window openings where windows have been removed.

K. Temporary Partitions: Not required.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with Owner and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary 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.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015719 - ENVIRONMENTAL PROTECTION DURING CONSTRUCTION

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. Scope
B. Applicable Regulations
C. Notification
D. Implementation
E. Protection of Land Resources
F. Recording and Preserving Historical and Archaeological Finds
G. Protection of Water Resources
H. Burning
I. Dust and Mud Control
J. Maintenance of Pollution Control Facilities During Construction

1.2 SCOPE

A. The work covered by this section consists of furnishing all labor, material and equipment and performing all work required for the prevention of environmental pollution during and as the result of construction operations under this contract except for those measures set forth in other Technical Provisions of these specifications.

For the purpose of this specification environmental pollution is defined by regulatory authorities as the presence of chemical, physical or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes.

The control of environmental pollution requires consideration of air, water and land, and involves noise, solid waste-management and management of radiant energy and radioactive materials, as well as other pollutants.

B. Compliance with the provisions of this section by all Subcontractors shall be the responsibility of the Contractor.

1.3 APPLICABLE REGULATIONS

A. In order to provide for abatement and control of any environmental pollution arising from the construction activities of the Contractor and his subcontractors in the performance of this contract, they shall comply with all applicable Federal, State and local laws, and regulations concerning environmental pollution control and abatement as well as the specific requirements stated elsewhere in the contract specifications.

1.4 NOTIFICATION

A. The Construction Manager will notify the Contractor in writing of any non-compliance with the foregoing provisions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Construction Manager may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost on account of any such stop orders shall be made the subject of a claim for extension of time or for extra costs or damages by the Contractor unless it was later determined that the Contractor was in compliance.

1.5 PROTECTION OF LAND RESOURCES

A. It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. Insofar as possible, the Contractor shall confine his construction activities to areas defined by the plans or specifications.

B. The following additional requirements are intended to supplement and clarify the requirements contained in the General Conditions.

The location on the project site of the Contractor's storage and other construction buildings, required temporarily in the performance of the work, shall be upon assigned portions of the job site and shall require written approval of the Construction Manager.

The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the overall construction of buildings.

Plans showing storage and office facilities shall be submitted for approval of the Construction Manager.

C. If the Contractor proposes or is required to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval at least 21 days prior to scheduled start of such temporary work.

1. A layout of all temporary access roads, excavations and embankments to be constructed with the work area.
2. Plans and cross sections of proposed embankments and their foundations, including a description of proposed materials.

1.6 RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS

A. All items having any apparent historical or archaeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archaeological find undisturbed and shall immediately report the find to the Construction Manager so that the proper authorities may be notified.

1.7 PROTECTION OF WATER RESOURCES

A. The Contractor shall not pollute streams, lakes, reservoirs or public waters with fuels, oils, bitumens, calcium chloride, acids or harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable Federal, State, County and Municipal laws concerning pollution of surrounding public waters. All work under this contract shall be performed in such a manner that objectionable conditions will not be created in public waters through or adjacent to the project areas.

B. Prior to any major construction the Contractor shall submit a plan for approval by the Construction Manager showing his scheme for controlling erosion and disposing of waste.

C. Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits.

Temporary erosion and sediment control measures such as berms, dikes, drains, or sedimentation basins, if required to meet the above standards, shall be provided until permanent drainage and erosion control facilities are completed and operative.

Fills and waste areas shall be constructed by selecting placement to eliminate silts or clays on the surface that will erode and contaminate adjacent public waters.

D. At all times of the year, special measures shall be taken to prevent chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides and insecticides, and cement and surface drainage from entering public waters.

E. Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to public waters shall be subject to the approval of the Construction Manager. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed of as directed by the Construction Manager, refilled with clean material and compacted all at the expense of the Contractor.

1.8 BURNING

A. Burning will not be permitted.

1.9 DUST AND MUD CONTROL

A. The Contractor shall at all times provide adequate dust control measures. He shall accomplish this, without interference to the public and vehicular transportation.

B. To control dust, it is required that all vehicles transporting dust producing materials to and from the job shall be covered with tarpaulins securely tied down, be sprinkled when necessary or be satisfactorily treated by other approved methods.

C. Trucks leaving excavations shall be water washed prior to entry on access roads or public streets to remove mud and other deleterious substances from wheels and undercarriages.

D. All public and private ways adjacent to the site shall be broomed and flushed whenever necessary in the opinion of the Construction Manager. Drainage

systems shall be cleaned and flushed whenever mud or debris hinders the flow of storm water to or in the sewers.

E. The Contractor shall immediately remove refuse, rubbish, debris and soil accumulations on roads, streets and on sidewalks, caused by wind, rain and snow erosions or by his own operations to prevent traffic hazards or interference with road drainage.

1.10 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this contract the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. During the construction period the Contractor shall conduct frequent training courses for his maintenance personnel. The curriculum shall include methods of detection of pollution, familiarity with pollution standards, and installation and care of vegetation covers, plants and other facilities to prevent and correct environmental pollution.

End of Section

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012300 "Alternates" for products selected under an alternate.
2. Section 012500 "Substitution Procedures" for requests for substitutions.
3. Section 014200 "References" for applicable industry standards for products specified.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

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

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

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

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

B. Mechanical Materials and Equipment: 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. Provide products which are compatible within systems and other connected items.

C. Asbestos in Materials: All products submitted for use and incorporated into this project shall be asbestos free.

D. Mercury-Free Products: All products submitted for use and incorporated into this Project shall be mercury-free. In the absence of mercury-free products, provide products with the lowest amount of mercury possible.

E. Lead-Free Products: All products submitted for use and incorporated into this Project shall be lead-free.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

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

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

C. Submittal Time: Comply with requirements in Section 017700 "Project Closeout."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. A named product and model number establishes the characteristics and salient features of the specifications even when they are not fully described and will serve as the basis of comparison.
8. Whenever a material, article, device, piece of equipment or type of construction is identified by reference to manufacturers' or vendors' names, trade names, catalog numbers, or similar specific information, it is so identified for the purpose of establishing a standard of quality, and such identification shall not be construed as limiting competition. Comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product

B. Product Selection Procedures:

1. Named Product: Where Specifications name a single manufacturer and product, and “no substitutions” is indicated, provide the named product. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Named Manufacturer/Source: Where Specifications name a single manufacturer or source and “no substitutions” is indicated, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

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

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Evidence that the proposed product provides sustainable design characteristics that specified product provides for achieving LEED prerequisites and credits.
3. Evidence that the proposed product will not adversely affect Contractor's construction schedule.
4. Evidence that the proposed product has received necessary approvals of authorities having jurisdiction.
5. Evidence that the proposed product will have no adverse effect on other trades and will not affect or delay progress schedule; or if proposed product involves more than one contractor, proposed product has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
6. Evidence that the proposed product maintenance service and source of replacement parts, as applicable, is available similar to the specified product.
7. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
8. Evidence that proposed product provides specified warranty.
9. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
10. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. Installation of the Work.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Requirements:
   1. Section 011000 "Summary" for limits on use of Project site.
   2. Section 013300 "Submittal Procedures" for submitting surveys.
   3. Section 017329 "Cutting and Patching" for cutting and patching portions of the building.
   4. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

A. Final As-Built Survey of Underground Utilities: Submit two paper copies and one electronic (.pdf) file, signed by land surveyor.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services:

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

D. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   1. Description of the Work.
   2. List of detrimental conditions, including substrates.
   3. List of unacceptable installation tolerances.
   4. Recommended corrections.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and/or Owner as required, that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field

measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
   2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Final Survey for Underground Utilities: Engage a land surveyor to prepare a final survey of all utilities installed during the project, including all elevations and inverts.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
   4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces without ceilings.

B. Mechanical Installations: Comply with the following requirements:

   1. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
   2. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
   3. Install all equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site, public pedestrian paths and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended,

use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017329 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes procedural requirements for cutting and patching.

B. Related Requirements:
1. Section 011000 "Summary" for limits on use of Project site.
2. Section 024119 “Selective Structure Removal and Demolition” for demolition of selected portions of the site for alterations.
3. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

C. Coordinate cutting and patching requirements with selective demolition. Removal of portions of existing construction required for the installation or performance of other work may be indicted as selective demolition on the demolition drawings. Cut and patch all construction when not shown on the demolition drawings, or when additional cutting and patching is required after the completion of selective demolition.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.

1.4 QUALITY ASSURANCE

A. Minimize cutting and patching of work by properly coordinating construction sequences with Construction Manager.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
   2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
      a. Primary operational systems and equipment.
      b. Fire separation assemblies.
      c. Air or smoke barriers.
      d. Fire-suppression systems.
      e. Mechanical systems piping and ducts.
      f. Control systems.
      g. Communication systems.
      h. Fire-detection and -alarm systems.
      i. Conveying systems.
      j. Electrical wiring systems.
      k. Operating systems of special construction.
   3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
      a. Water, moisture, or vapor barriers.
      b. Membranes and flashings.
      c. Exterior curtain-wall construction.
      d. Sprayed fire-resistive material.
      e. Equipment supports.
      f. Piping, ductwork, vessels, and equipment.
      g. Noise- and vibration-control elements and systems.
   4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
   1. Cutting and Patching of Existing Roofing System: Contractors performing cutting and patching of the existing roof membrane shall be certified installers by the existing roof membrane manufacturer for their products. When existing roofing system is still under warranty, coordinate all work on the existing roofing system with manufacturer. All cutting and patching work on roofing system shall be performed in a manner that does not void the warranty.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 1000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
   2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
      b. Restore damaged pipe covering to its original condition.
   3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
      a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
   4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
   5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction 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.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 15 days of date established for commencement of the Work.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, and waste reduction work plan. Distinguish between demolition and construction waste.

B. Waste Identification: Indicate anticipated types of demolition and construction waste generated by the Work.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

1. Construction Waste:

a. Packaging: Salvage or recycle 100 percent of the following uncontaminated packaging materials:

1) Paper.
2) Cardboard.
3) Boxes.
4) Plastic sheet and film.
5) Polystyrene packaging.
6) Wood crates.
7) Wood pallets.
8) Plastic pails.

b. Construction Office Waste: Salvage or recycle 100 percent of the following construction office waste materials:

1) Paper.

2) Aluminum cans.
3) Glass containers.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
2. Review waste management procedures with all entities when they first begin work on-site, including locations established for salvage, recycling, and disposal.

B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 017300 "Execution" for progress cleaning of Project site.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

B. Attic stock in the required amount/percentage shall be turned over to the Owner immediately after the first delivery of the material is received on the site, not at the end of the project.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
7. Submit fully executed Certification of Drawings and Specification Compliance form included at the end of this Section.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Architect will perform inspection in areas no smaller than a floor plate. Inspection of individual rooms or spaces will not be performed.
2. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
    a. Reinspection Limits: The Architect and Construction Manager are limited to performing the original inspection and two reinspections of the same area as part of their services. The cost of any reinspections required beyond this amount will be borne by the Contractor. Contractor shall reimburse Owner for reinspection fees paid to the Architect and/or Construction Manager through a credit change order in the amount stipulated by the Owner

3. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final

inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
    a. Reinspection Limits: The Architect and Construction Manager are limited to performing the original inspection and two reinspections of the same area as part of their services. The cost of any reinspections required beyond this amount will be borne by the Contractor. Contractor shall reimburse Owner for reinspection fees paid to the Architect and/or Construction Manager through a credit change order in the amount stipulated by the Owner

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

Attachment: Certification of Drawing and Specification Compliance form

CERTIFICATION OF DRAWING AND SPECIFICATION COMPLIANCE

The Undersigned Prime Contractor does herein certify that:

1. All materials furnished for this project do fully comply with all specification requirements as stated within the Contract Documents;
2. That no asbestos containing materials of any nature are used in the work;
3. That execution of the Work covered by this certification has been performed in accordance with the Contract Document drawings.

CONTRACT NUMBER AND CONTRACT NAME: _____

NAME OF CONTRACTOR: _____

CERTIFICATION BY: _____ TITLE: _____

ADDRESS: _____

DATED: _____

CORPORATE ACKNOWLEDGEMENT

)SS.
)

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ that he is the officer of the said corporation executing the foregoing instrument, that he knows the seal of said corporation, that the seal affixed to said instrument is such corporate seal, that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

_____
Notary Public

INDIVIDUAL ACKNOWLEDGEMENT

State of

)SS.
)

County of

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ that he is the individual who executed the foregoing instrument.

_____
Notary Public

PARTNERSHIP ACKNOWLEDGEMENT

State of
)SS.
)
County of

On the _____ day of _____, before me came _____ to me known and who by me being duly sworn did depose and say that he resides at _____ that he is the partner in the firm of _____ doing business under the name of _____ and that he executed the foregoing instrument on behalf of said partnership.

_____
Notary Public

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

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

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.2 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.

1.3 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file complete with Table of Contents and book marked by equipment. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

C. Initial Manual Submittal: Submit draft copy of each manual at least 60 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 30 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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

1. Title page.
2. Table of contents.

3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Name and contact information for Commissioning Authority.
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. Cross-reference to related systems in other operation and maintenance manuals.

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

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

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

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. 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, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. 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. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

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

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

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.

7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

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

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

2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

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

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
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 MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance

procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

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

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

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

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

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

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

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

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

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

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

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

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."

G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous Record Submittals.

B. Related Requirements:

1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Submit PDF electronic files of scanned record prints and one set of prints.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record ("As- Built") Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Field Order.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

7. Format: Submit PDF electronic files of scanned record prints and one set of prints.
   a. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
   b. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
   c. Identification: As follows:
      1) Project name.
      2) Date.
      3) Designation "PROJECT RECORD DRAWINGS."
      4) Name of Architect
      5) Name of Contractor.

B. Record Digital Data Files: In addition to submitting paper Record Drawings, transfer information to electronic CAD drawings in .DXF format and prepare set of digital record drawings. Architect will supply a set of base electronic drawings for Contractor's use. Submit electronic Record Drawings to Owner in same manner as paper Record Drawings.

C. The following certification shall appear on all Record Drawings: "These record drawings prepared by _____for the following work _____ have been reviewed by the undersigned and appear to be an accurate representation of the work incorporated within the project and are accepted as submitted in accordance with the technical documents. This record document review made by this office is for determination of compliance with the requirements of the contract documents.
Firm Name: _____ Date: _____ Reviewer Name: _____ _I

D. If the Construction Manager or Architect determines the Record Drawings are not complete or contain inaccurate information, they will return the documents to the Contractor for correction and resubmission.

E. Final payment will not be made to Contractor until complete and accurate Record Drawings both on paper and electronic media have been received and accepted by Owner.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders**,** record Product Data**,** and record Drawings where applicable.

B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Contractor.
e. Date of video recording.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

a. System, subsystem, and equipment descriptions.
b. Performance and design criteria if Contractor has delegated design responsibility.
c. Operating standards.
d. Regulatory requirements.

e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:

a. Emergency manuals.
b. Operations manuals.
c. Maintenance manuals.
d. Project record documents.
e. Identification systems.
f. Warranties and bonds.
g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect, with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Provide operating and maintenance instruction to Owner's personnel for systems and components as indicated in individual Specification Sections. Provide instruction periods, comprised of approximately 50 percent classroom instruction and 50 percent "hands-on" instruction.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids.

B. Video: Provide minimum 640 x 480 video resolution converted to .mp4 format file type, on electronic media.

1. Electronic Media: CD ROM or thumb drive, with computer made label.
2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.
2. Produce segments to present a single significant piece of equipment per segment.
3. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
4. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording. Furnish additional portable lighting as required.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

HAZMAT ABATEMENT WORK PLAN

for

Robert E. Bell Middle School
50 Senter Street
Chappaqua, New York

Prepared For:

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, NY 10514

Prepared By:

Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C.
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October 7, 2024
101134406

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SECTION 020810

ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The asbestos abatement contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. The asbestos abatement contractor is responsible for the confirmation of the actual total quantities of the Work. The asbestos abatement contractor shall provide all labor, equipment and materials necessary to complete the Work in accordance with the Contract Documents. All asbestos material is to be disposed of as ACM waste. Quantities indicted below are confirmed asbestos.

B. This work plan has been developed to comply with the regulations under Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (Cited as 12 NYCRR Part 56), Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(b)(4), Hazardous Waste Operations and as per contract documents and specifications.

Robert E. Bell Middle School
50 Senter Street, Chappaqua, New York 10514

1. Drawing H-002.00: First Floor Plan

Work Area #	Location	Asbestos-Containing Materials	Approximate Quantity	Removal Procedure
1	Pit Room Behind Kitchen	Duct Insulation-White near ceiling	+/- 90 SF (or as per the final scope of work_	NYSDOL 12 NYCRR Part 56-7.11 (1)(i) NEGATIVE PRESSURE TENT
2	Break Room	Associated Pipe Fittings (Assumed Present Above Ceiling)	+/- 30 LF (or as per the final scope of work)	

2. Drawing H-003.00: Third Floor/Attic Plan

Work Area #	Location	Asbestos-Containing Material	Approximate Quantity	Removal Procedure
3	Attic/Mechanical Room	Caulking Associated with the HVAC System	+/- 500 LF (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-7.11 (1)(i) NEGATIVE PRESSURE TENT
		Pipe Fittings	+/- 30 LF (or as per the final scope of work)	
4	Faculty Room, Attic Level	Fiber Board Wall Panel Adhesive Paper	+/- 200SF (or as per the final scope of work)	

3. Drawing H-003.00: Roof Plan

Work Area #	Location	Asbestos-Containing Material	Approximate Quantity	Removal Procedure
5	Cafeteria Roof	Roof Perimeter Flashing	+/- 100 SF (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-11.6 Exterior Removal of Non-Friable ACM Materials
6	Pitched Slate Cupola Roof	Skylight Glazing/Caulking	+/- 100 LF (or as per the final scope of work)	

B. The Contractor is responsible for completing all notifications and variances required to meet the determined start date (if applicable).

C. If asbestos containments are required, the Contractor shall establish the asbestos containments so as to not interfere with operation of or access to the temporary equipment that shall be installed by others.

D. The Contractor shall <u>field verify</u> the amount of ACM and familiarize him/her-self with all variable field conditions in the building before the submission of his/her quote. The quantities presented in this specification are approximate only and should not be used solely as the basis for any quote. Any discrepancies or difference in the

approximate and actual quantities shall be resolved before the award of any Contract. No change order relative to ACM material quantity will be permitted after the award of the Contract, unless new areas are added. In the event that suspect materials not included in this Specification are encountered while the work is in progress, such material shall be tested and, if confirmed ACM, removed as ACM, in accordance with the procedures contained herein. The discovery of any new material(s) should not delay the progress of the work as contained in this specification. Payment for any additional work will be considered on a case-by-case basis by the Environmental Consultant and Chappaqua CSD. It is the responsibility of the Contractor to determine and negotiate the full cost of any such payment prior to performance of any additional work.

F. ACM shall be properly handled, packaged, and transported for disposal in a landfill in accordance with all Federal, State and Local regulations. After September 4, 2006, the Contractor shall follow Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (Cited as 12 NYCRR Part 56) as amended effective March 21, 2007. All related manifests and shipping logs shall be provided to Chappaqua CSD upon or before the end of the project.

G. All work shall be accomplished in strict adherence to the project Specification, applicable Federal, State, and Local Regulations. Whenever there is a conflict or overlap of the above references, the more stringent provision shall apply.

H. The Contractor's industrial hygiene practices during asbestos abatement will be monitored by Chappaqua CSD's Environmental Consultant. The Contractor shall be responsible for monitoring his/her own construction safety work practices for compliance with the OSHA regulations.

I. The Asbestos Contractor shall provide the best available technology, and state-of-the-art procedures and methods of execution, clean-up, disposal, and safety.

J. The Contractor will be required, if approved by Chappaqua CSD and/or its Representative, to obtain at his/her own expense appropriate variances from regulatory agencies as required to complete the safe removal of asbestos containing material as described in this specification.

K. Chappaqua CSD's environmental consultant will sample all suspect materials that may be identified during the course of demolition, if applicable. The Contractor shall provide access to the consultant to perform the testing and no additional costs will be paid for the time it takes to perform the testing. The contractor shall provide itemized cost proposal to Chappaqua CSD which must include separate costs for the abatement of the individual materials revealed to be ACM (if applicable). Additional asbestos-containing materials shall not be abated without written authorization from Chappaqua CSD or environmental consultant. The contractor will not be compensated for any additional materials that can be encountered during the abatement project, without prior written authorization from Chappaqua SD or environmental consultant.

1.02 PHASING OF WORK:

This work shall include asbestos abatement associated with upcoming additions and alteration projects at Robert E. Bell Middle School. The Asbestos Contractor shall perform and complete the abatement of asbestos-containing materials during regular working hours, Monday through Friday between 8:00 am and 4:00 pm or as directed by the facility. It is the Contractor's responsibility to ensure that acceptable visual inspection and air monitoring results are obtained with fiber count of <70 Structures/mm2 of air using AHERA analysis method and are completed prior to the return of building occupants or other trades. All work shall be coordinated with Chappaqua CSD and Chappaqua CSD's Environmental Consultant prior to start of any work. The Chappaqua CSD's Environmental Consultant shall be present whenever any asbestos abatement work is being conducted.

1.03 AUTHORITY TO STOP WORK:

Chappaqua CSD and the Environmental Consultant shall have the authority to stop the abatement work at any time the contractor's work is not in conformance with the Specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected to the satisfaction of Chappaqua CSD and the Environmental Consultant. Standby time to resolve the problems shall be at the contractor's expense.

1.04 SITE REQUIREMENTS:

A. Noise Control: Provide mufflers or other acceptable means of noise reduction for all equipment to be used by the Contractor. Observe local laws regarding noise control.

B. Wastewater: All water used by the Contractor during asbestos abatement activities shall be collected and passed through a water filtration system capable of filtering particles down to 5 microns prior to being discharged into the sanitary sewer. The Contractor shall contact the Westchester County engineering department to determine the acceptable location(s) to access the sanitary sewer. The Contractor shall be responsible for connection to the sanitary sewer, and for providing piping, pumps, water filtration systems, and other items necessary to collect, transport, filter, and dispose of the wastewater.

C. Log In/Out: The Asbestos Contractor must ensure all workers log in and out daily at the site.

D. The location of the Decontamination Unit shall be a location agreed upon between The Asbestos Contractor, Chappaqua CSD and Chappaqua CSD's environmental consultant. All variations must be coordinated and approved by the site manager and Chappaqua CSD's Environmental Consultant.

1.05 HEALTH AND SAFETY:

A. Toxic Effects: The Contractor shall assume all responsibility for any toxic effects to workers from the air supplied to respirators, or from toxic or damaging vapors or

residues resulting from the use of encapsulant and/or wetting agents or other substances used by the Contractor during construction.

B. Chemical/Biological Hazards: The known chemical/biological hazards on site include asbestos-containing material and debris. The Contractor shall provide materials, equipment and training to its workers to ensure their protection from these and any other chemical/biological hazards which may be identified during the course of this work.

C. Physical Hazards: The Contractor shall provide safety equipment and training to his/her workers to ensure their protection from any physical hazards including but not limited to trip/fall hazards, working at elevation, heat stress, contact with energized (hot) active equipment, noise, overhead bump hazards, and electrical shock that may be present during the Work.

D. Safety Act: The Occupational and Safety Health Act (OSHA) of 1970, as amended, shall be strictly complied with during the course of this project. This Act shall govern the conduct of the Contractor's workmen, tradesmen, material-men, and subcontractors, and visitors to the project site.

E. Accident Prevention: In order to protect the lives and health of his/her employees, the Contractor shall comply with all pertinent provisions of the latest edition of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc. and shall maintain an accurate record of all accidents which occur during the project. An injury or loss of life must be immediately reported by the Contractor to the Chappaqua CSD and/or its Representatives, and a copy of the Contractor's report to his/her insurer of an accident must be provided to the Chappaqua CSD and/or its Representatives.

F. Emergency Response: The Contractor shall establish an Emergency Response Team made up of members of his/her work force. Team members shall be trained, organized, and capable of responding in the event of an accident, fire, or other emergency. The Contractor shall designate a site Safety Coordinator to train team members regarding the location and use of site-specific fire/life safety equipment. As a minimum requirement, members of the Emergency Response Team shall be knowledgeable in standard first aid and CPR techniques, fire extinguisher use, and evacuation procedures.

G. Workmen Protection: The Contractor shall provide and maintain all safety measures necessary to properly protect workmen.

H. Emergency Actions: In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, to prevent such threatened loss or injury without special instruction or authorization from the Chappaqua CSD and/or its Representatives, is hereby permitted to act at his/her discretion.

I. Hazard Communication Act: The Contractor shall comply with the Hazard Communication Standard promulgated by the Occupational Safety and Health Administration (OSHA No. 29 CFR 1910.1200). This program ensures that all

employers provide the information they need to inform and train employees properly and to design and put in place employee protection program. It also provides necessary hazard information to employees so they can participate in, and support, the protective measures needed at their work place. The contractor shall ensure that labels or other forms of warning are legible in English. Employer having employees who speak other languages must add the information in their languages. See OSHA 29 CFR 1910.1200 for more details.

1.06 WORK SUPERVISION AND COORDINATION:

A. Abatement Contractor's Supervisor: From the start of work through to the project completion the Contractor shall have on-site a responsible and competent supervisor who posses valid NYSDOL Supervisor certifications. As a minimum, the Asbestos Contractor's Supervisor shall meet the qualifications as required by Article 1.12, for a job supervisor. The Supervisor shall be on site during all working hours. When the Supervisor must leave site during work, a temporary Supervisor shall be appointed.

B. Quality of Work: The Supervisor shall supervise, inspect and direct the Work competently and efficiently, devoting such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Supervisor shall be responsible to see that Work complies accurately with the Contract Documents, and that all Work installed is of good quality and workmanship.

1.07 SUBMITTALS:

Unless otherwise noted the Contractor shall submit three (3) copies of each APPLICABLE submittal to the Chappaqua CSD’s Environmental Consultant and its Representatives for review and/or approval. The Contractor shall provide the following:

A. Pre-Project Submittal:

1. Certificates of Insurance naming Chappaqua CSD as additional insured.

2. All required bonds. All bonds shall be underwritten by a United States based, preferably New York State, A or B rated bonding company.

3. List of Subcontractors.

4. Health and Safety Plan: Provide a written Health and Safety Plan addressing procedures for work place safety. As a minimum, the following topics shall be addressed in the plan:

a. Hazard Communication. Procedure on how physical and health hazards associated with the work are identified and communicated to employees, and name of the person responsible for implementation of the Hazard Communication Program.

b. Guidelines for assessment and prevention of heat stress.

c. Procedures for using ladders safely.

d. Electrical safety procedures.

e. Emergency Action Plan: The Contractor shall submit for review a written Emergency Action Plan. This Plan shall outline the contingency actions to be performed for emergencies including fire, accident, power failure, supplied air system failure, breach of work area containment, unexpected asbestos contamination in the site area and on the adjoining grounds, or spilling of asbestos material being hauled to storage and/or disposal. This Plan shall identify the manner in which emergencies are announced, emergency escape procedures and routes, and procedures to account for all employees after evacuation. The Plan shall identify those persons responsible for fire/life safety duties including the Site Safety Coordinator, persons responsible for fire prevention equipment and the control of fuel source hazards, and the members of the Emergency Response Team (see Paragraph "Emergency Response" of this Section). This Plan shall be readily available for review by all workers.

f. Fall Protection Plan: The Contractor shall submit for review a written Fall Protection Plan. This plan shall outline the actions to be performed to protect personnel when they are working at elevation. The plan shall detail specific fall protection devices to be utilized, training provided to personnel for same and training of designated competent person in charge of and responsible for the elevated work site.

5. Proof of written notifications required by Paragraph "Codes, Permits and Standards" of this Section. Proof that all required permits and variances have been obtained. NYSDOL and EPA project notifications paid in full.

6. Proof of written notification to the local police department, fire department and Facility (include a copy of required by NYS DOL 12 NYCRR PART 56 section 563.6a ten day notice) that asbestos abatement work is being conducted. As a minimum, the notification letter shall include the address of the Facility, dates work is to be performed, and drawings indicating the areas to undergo abatement.

7. Documentation of compliance with all requirements of paragraph "Requirements and Qualifications" of this Section. Submittal shall include:

   a. Proof that the job supervisors, foremen, and asbestos abatement workers meet State certification and license requirements.

   b. Proof of a current medical surveillance program for all Contractor's personnel to work on this project.

c. Completed and notarized Certificate of Worker's Release for each asbestos abatement worker, workers of other trades, or supervisory personnel who enter the work area or otherwise contact ACM.

8. Proof of a respiratory protection program. Submit level of respiratory protection intended for each operation required by the project.

9. Proof of historic airborne fiber data. Submit airborne asbestos fiber monitoring data from an independent air monitoring firm to substantiate selection of respiratory protection proposed. Data shall include the following for each procedure required by the work: 1. date of measurement; 2. type of work task monitored; 3. methods used for sample collection and analysis, and; 4. number, duration and results of samples taken.

10. Proof that a landfill site has been located, and arrangements for transport and disposal of asbestos-containing or asbestos-contaminated materials have been made. Provide the name and location of the landfill, and waste transport company, if applicable.

11. Manufacturer's literature on all proposed job related equipment and products to be used on this project. Include Safety Data Sheets (SDS) for encapsulant, fire retardant plastics, mastic remover and other chemicals to be used on this project.

12. A detailed Asbestos Removal and Disposal Work Plan which describes all aspects of the work to be performed for this project. The Plan shall include the following:

a. A detailed description of the work area enclosure. Provide shop drawings (with dimensions and locations) of proposed decontamination facilities and work areas. These drawings shall indicate the following: 1) areas to be sealed off and work area boundaries; and 2) proposed layout and location of the decontamination enclosure systems. Include a detailed description of any modifications or changes to be made to the specified negative pressure work area enclosure.

b. Specimen of the daily log proposed for use. Minimally, the log should include the date(s) and time(s) when all personnel enter and leave the work area(s).

B. During Work Submittal:

1. Schedule of Work Changes: Any changes in the Schedule of Work proposed by the Contractor shall be submitted for approval to Chappaqua CSD no later than seven days prior to the commencement date of the proposed change. A revised Schedule shall be submitted at the end of each week.

2. Notarized copy of payroll showing that prevailing wage rates have been paid shall be submitted to the Chappaqua CSD on a weekly basis. Contractor shall use DOL form for wage payment.

3. A "Request For Services" form shall be submitted at least 24 hours in advance of required air monitoring tests and inspections to be performed by the Chappaqua CSD's Environmental Consultant.

4. Results of all air monitoring performed by the Contractor shall be posted within 24 hours for regular abatement project after collection for all workers to see. A copy of the results shall be given to the Chappaqua CSD's Environmental Consultant at the same time.

5. A certified, signed, and completed copy of each "Waste Shipment Record" form used, and receipts from the landfill operator which acknowledge the Contractor's delivery(s) of material, shall be submitted to the Consultant and Engineer within thirty days following removal of ACM from building.

6. A copy of the bound log book.

C. Post Project Submittal:

1. A notarized "Release of Liens" in a form acceptable to the Chappaqua CSD. Use the standard AIA form. Such notarized release of all liens shall certify that all subcontractors, labor suppliers, etc., have been paid their pro rate share of all payments to date, that the contractor has no basis for further claim, and will not make further claim for payment in any account after the first payment is made to him.

2. Proof of payment of prevailing wage rate to direct employees and subcontractor.

3. Notarized copies of a daily log showing the date(s) and time(s) of entrance to and exit from the work area(s) for all persons.

4. Compilation in chronological order of all air monitoring records pertaining to this project.

5. Compilation of all completed and signed Waste Shipment Record forms, bills of lading, or disposal receipts pertaining to this project.

6. Copies of notifications and checks to applicable agencies (see Subparagraph "Pre-Project Submittal Information" of this Section) that the asbestos abatement project has been completed.

7. Contractor shall submit the following items as part of his final submittals: Paid invoice verifications for sub-contractor (for Time and Material job), service contract agreement, insurance certificates, copies of the workers licenses (NYSDOL), and other submittal required for the Specification.

1.08 FIRE PROTECTION AND EMERGENCY EGRESS:

The Contractor shall be responsible to the security and safeguarding of all areas turned over by the facility to the Contractor. The Contractor shall designate to his/her workers and other building occupants a means of egress in case of emergency.

A. The Contractor shall establish emergency and fire exits from the work area. First aid kit, 2 full sets of protective clothing and respirators shall be provided for use by qualified emergency personnel in the clean room of the decontamination facility.

B. For full containment only, the Contractor shall provide a secure work area to protect against unauthorized entry into and around the work area. Any hazardous conditions shall be reported to the contractor's Supervisor and the contractor shall correct the hazard immediately. Any intrusion or incident shall be documented in a bound log book which shall be maintained at the project site.

1.09 CLEAN-UP:

A. Asbestos Related Clean-up: All clean-up work related to asbestos abatement work shall be in strict accordance with general technical requirements and this specification.

B. Final Site Cleaning: Upon completion of the work, the Contractor shall remove all temporary construction, decontamination facilities, and unused materials placed on site by the Contractor; put the premises in a neat and clean condition; and provide all sweeping, cleaning, and washing required to restore the site to its original condition.

1.10 CODES, PERMITS, AND STANDARDS:

A. The Contractor shall be solely responsible for compliance with all applicable federal, state (12 NYCRR Part 56 Adopted March 21, 2007), and local laws, ordinances, codes, rules, and regulations which govern asbestos abatement work or hauling and disposal of asbestos waste material. The current issue of each document shall govern. All work shall comply with all applicable codes and regulations as amended.

B. Before starting the work, the Contractor shall examine the Technical Specification for compliance with codes and regulations applicable to the work and shall immediately report any discrepancy to the Chappaqua CSD's Environmental Consultant.

C. Where conflict among requirements or with these Specifications exists, the more stringent requirements shall apply.

D. Permits, State Licenses, and Notifications: The Contractor shall be responsible for obtaining necessary permits, variances, state licenses, and certifications of personnel in conjunction with asbestos removal, hauling, and disposition and shall provide timely notification of such actions as may be required by federal, state, regional, and local authorities. Fees and/or charges for these licenses, permits, and

notifications shall be paid by the Contractor. Contractor shall use all notification forms where applicable.

1. Agency Notification: At least 10 days prior to commencement of any asbestos removal, the Contractor shall prepare written notification to EPA Region 2, to the New York State Department of Labor (NYSDOL), and all other applicable agencies having jurisdiction. In addition, the Contractor shall be required to obtain any other permits for work covered under this specification including permits required for air sampling.

1.11 TERMINOLOGY:

The following commonly-used terms are defined in the context of these Specifications:

A. Asbestos Project: Work that involves the removal, encapsulation, enclosure, repair or disturbance of friable or non-friable asbestos, or any handling of asbestos material that may result in the release of asbestos fibers. For the purpose of compliance with this Part, an asbestos project shall include any disturbance of asbestos fibers, and the planning, asbestos survey (as per Subpart 56-5.1), design, background air sampling, inspection, air sampling and oversight of abatement work, cleanup, and the handling of all asbestos material subject to abatement, as well as the supervising of such activities. Installation of friable ACM shall also be considered an asbestos project. An asbestos project starts with Phase I when the planning, asbestos survey, and design work begins or is required to begin. The project shall not be considered completed until Phase II D is complete.

B. Asbestos-Containing Material (ACM): Any material or product which contains more than 1 percent asbestos.

C. Aggressive Air Sampling: Air monitoring samples collected while a leaf blower, fans, or other such devices are used to generate air turbulence within the work area.

D. Air Filtration Device (AFD) - A portable local exhaust system equipped with HEPA filtration, capable of maintaining a constant low velocity air flow into contaminated areas from adjacent, uncontaminated areas and capable of maintaining a negative air pressure with respect to the adjacent, uncontaminated areas.

E. Air Lock: A system for permitting ingress or egress to the work area while permitting minimal air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways placed a minimum of three feet apart.

F. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time. Personal air sampling results shall be calculated to reflect the employee's eight-hour time weighted average (TWA) exposure. Area sampling results are reported directly, without calculating the TWA.

G. Amended Water: Water to which a surfactant has been added.

H. Asbestos Removal Encapsulant: A chemical solution used in place of amended water during asbestos removal to penetrate, bind, and encapsulate the asbestos-containing material.

I. Authorized Visitor: Chappaqua CSD's Environmental Consultant or representatives of any regulatory or other agency having jurisdiction over the project.

J. Chappaqua CSD's Environmental Consultant: Chappaqua CSD's agent who is authorized to exercise general contract administration and industrial hygiene inspection of the work.

K. Certified Industrial Hygienist (CIH): One certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.

L. Class II asbestos work: Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Class I asbestos work includes the removal of thermal system or surfacing materials.

M. Competent Person: Definition and responsibilities as set down in 29 CFR 1926.1101(b) and as outlined herein.

N. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

O. Decontamination Enclosure System: A series of connected rooms for the decontamination of workers (a Personnel Decontamination Enclosure System) or of materials and equipment (Equipment Decontamination Enclosure System).

P. Equipment Decontamination Enclosure System: A decontamination system for waste materials and equipment, typically consisting of a designated area of the work area, a washroom, and a holding area, with an air lock between any two adjacent rooms and a curtained doorway between the holding area and the non-work area. Not to be used for personnel entry/exit.

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

R. Encapsulation: Application of an encapsulant to asbestos-containing building materials to control the possible release of asbestos fibers into the ambient air.

S. Enclosure: Procedures necessary to completely enclose ACM behind air-tight, impermeable, permanent barriers.

T. Excursion Limit (EL): The EL is an airborne concentration of asbestos to which no employee shall be exposed when not using respiratory protection. The EL is 1.0 f/cc as averaged over a 30 minute period.

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

V. Friable: Any material which, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, or is capable of being released into the air by hand pressure.

W. Full Facepiece High Efficiency Respirator (FFHER): A respirator which covers the wearer's entire face from the hairline to below the chin and which is equipped with a HEPA filter.

X. Half Mask High Efficiency Respirator (HMHER): A respirator which covers one-half of the wearer's face, from the bridge of the nose to below the chin, and is equipped with HEPA filters.

Y. HEPA Filter: A high efficiency particulate air (HEPA) filter capable of trapping and retaining 99.97 percent of the fibers of 0.3 micrometer or larger in diameter.

Z. HEPA Vacuum Equipment: High efficiency particulate air (HEPA) filtered vacuuming equipment having a UL 586 filter system capable of collecting and retaining asbestos fibers.

AA. Large Asbestos Project: Large asbestos project shall mean an asbestos project involving the disturbance, enclosure, encapsulation, repair or handling of 160 square feet or more of ACM, PACM or asbestos material or 260 linear feet or more of ACM, PACM or asbestos material.

AB. Lockdown: Procedure of applying an encapsulant as a protective coating or sealant to a surface from which ACM has been removed in order to control and minimize airborne asbestos fiber generation that might result from residual asbestos-containing debris.

AC. Minor Asbestos Project: Minor project shall mean an asbestos project involving the disturbance, enclosure, encapsulation, repair or handling of 10 square feet or less of ACM, PACM or asbestos material or 25 linear feet or less of ACM, PACM or asbestos material.

AD. Movable Object: A unit of equipment or furniture which can be removed from the work area.

AE. Plasticize: To cover floors and walls with plastic sheeting as herein specified.

AF. Permissible Exposure Limit (PEL): The PEL is an airborne concentration of ACM to which no employee shall be exposed when not using respiratory protection. The OSHA PEL is 0.1 f/cc expressed on an 8-hour time weighted average (TWA).

AG. Personnel Decontamination Enclosure System: A decontamination system for personnel and limited equipment, typically consisting of an equipment room, shower room, and clean room, with an air lock between any two adjacent rooms, and a curtained doorway between the equipment room and the work area, and a curtained doorway between the clean room and the non-work area. The decontamination system serves as the only entrance/exit for the work area.

AH. Powered Air Purifying Respirator (PAPR): Either a full face-piece, helmet, or hooded respirator that powers breathing air to the wearer after the air has been purified through a HEPA filter.

AI. Regulated Abatement Work Area: The portion of the restricted area where abatement work actually occurs. For tent work areas, the interior of each tent is a regulated abatement work area. For OSHA Class I and Class II asbestos abatement, the interior of the restricted area containment enclosure is the regulated abatement work area. For exterior non-friable asbestos abatement conducted without the establishment of negative air ventilation systems or containment enclosures, the entire restricted area surrounding the abatement location is considered to be the regulated abatement work area.

AJ. Removal: The act of removing and transporting asbestos-containing or asbestos-contaminated materials from the work area to a suitable disposal site.

AK. Small Asbestos Project: Small asbestos project shall mean an asbestos project involving the removal, disturbance, repair, encapsulation enclosure or handling of more than 10 and less than 160 square feet of ACM, PACM or asbestos material or more than 25 and less than 260 linear feet of ACM, PACM or asbestos material.

AL. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

AM Tent Procedure: A fire retardant polyethylene enclosure that includes walls, ceiling and a floor as required to remove ACM, PACM or asbestos material.

AN. Type C Respirator: A respirator which supplies air to the wearer from a source outside the work area by means of a compressor.

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

AP. Work Area: Designated rooms, spaces, or areas of the project where asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area has been sealed, plasticized, and equipped with an airlock entrance or a decontamination enclosure system. A non-contained work area is an isolated or controlled-access area which has not been plasticized.

1.12 REQUIREMENTS AND QUALIFICATIONS:

A. Minimum Experience: The Contractor shall have experience with abatement work, as evidenced through participation in at least ***five*** asbestos abatement projects of complexity comparable to this project.

B. Experience and Training: The Contractor's job supervisors, foremen, and workers shall be adequately trained and knowledgeable in the field of asbestos abatement. All personnel engaged in asbestos abatement or related activities shall have New York State DOL certifications. All phases of the work shall be executed by skilled craftsmen experienced in each respective trade. Proof of such experience shall be submitted upon request by the Chappaqua CSD. Improperly trained, untrained, or inexperienced personnel shall not be allowed in the work area(s). Personnel shall meet minimum training and experience requirements outlined in this Section.

1. The Contractor's on-site job supervisor shall have successfully completed, within the last twelve months, the NYSDOH-approved course "Supervision of Asbestos Abatement Projects", and shall be qualified as a NYSDOL-certified Contractor/Supervisor. Course must be provided by an NYSDOH-approved training provider. The supervisor shall have experience with abatement work, as evidenced through participation in at least two asbestos abatement projects of complexity comparable to this project.

2. The job supervisors and foremen shall be thoroughly familiar with and experienced in asbestos removal and related work and shall meet the requirements of a competent person set down in OSHA Standard 29 CFR 1926.1101.

3. All asbestos abatement workers shall be knowledgeable, qualified, and trained in the removal, handling, and disposal of asbestos material and in subsequent cleaning of the affected environment. All asbestos abatement workers shall be certified as having attended and satisfactorily completed asbestos worker training in accordance with OSHA Standard 29 CFR 1926.1101(k)(3). Course must be provided by an NYSDOH-approved training provider.

4. The Contractor's job supervisors, foremen, and asbestos abatement workers shall be certified and licensed as required by the NYSDOL.

5. Prior to commencement of work, all personnel who are to enter the work area shall be instructed in and shall be knowledgeable of the appropriate procedures for personnel protection and asbestos abatement. On-site training in the use of equipment and facilities unique to this job site shall be performed. Emergency evacuation procedures from the work area shall also be included in worker training.

C. Supervision Requirements: The Contractor shall provide adequate job supervision for all phases of the asbestos abatement work.

1. The Contractor shall have a NYSDOL job supervisor present on site whenever work described in this Section is in progress. If the job supervisor leaves the site for any reason a qualified and certified supervisor, who meets the requirements of this Section and is familiar with the current status of the work, shall be designated. Chappaqua CSD's Designated Representative shall be informed of the substitution. The supervisor must be familiar and experienced with asbestos removal and its related work, safety procedures, and equipment.

D. Worker Medical Examinations: The Contractor shall provide medical examinations for all employees engaged in asbestos removal and disposal operations, in accordance with OSHA Standards 29 CFR 1910.134(b), 1926.1101, and applicable state regulations. The Contractor shall ensure that all employee examination results are on file in his office and available for review and are maintained in accordance with OSHA Standard 29 CFR 1926.1101 (n) (3).

E. Certificate of Worker's Release: Each asbestos abatement worker, workers of other trades, or any supervisory personnel who enter the work area, or otherwise contact ACM, shall submit a Certificate of Worker's Release, as required in the Section "Submittal".

1.13 TESTING AND INSPECTION REQUIREMENTS AND RESPONSIBILITIES:

Visual inspections and air monitoring will be performed before, during, and after asbestos abatement to document airborne asbestos fiber concentrations as defined in this specification.

A. Chappaqua CSD's Responsibilities:

1. Chappaqua CSD will employ an Environmental Consultant to perform Project Monitoring and air testing. The project monitor will have the authority to approve the contractor's work, stop the contractor's work and direct the contractor to take corrective actions where required.

2. Area air samples will be collected and analyzed using NIOSH Method 7400. Air samples will be collected during each shift as required by the regulations.

3. Clearance testing by Transmission electron microscopy (TEM) will be conducted as per AHERA regulations. Air samples will be collected to demonstrate final re-occupancy clearance for work areas within the building. The fiber concentration must comply with the specified clearance level as per AHERA and this specification. Chappaqua CSD will provide for collection and analysis of one round of samples required to demonstrate clearance in each discrete work area.

4. Chappaqua CSD's Environmental Consultant will perform inspections of the work area, as specified, upon request of the Contractor.

B. Contractor's Responsibilities:

1. TEM air samples which fail to meet the re-occupancy clearance standard

shall be paid for by the Contractor. Should a delay occur, due to failure(s) of clearance air testing, all associated expenses such as TEM analysis, and the Environmental Consultant's time for additional cleaning and air testing, shall be paid by the asbestos contractor. If results of the inside work area group of air samples are unsatisfactory, recleaning of regulated abatement work area surfaces using wet methods, followed by another drying time period and then collection and analysis of an additional set (both inside and outside work area samples) of clearance air samples is required. If only the results of the outside work area group of air samples is unsatisfactory, cleanup of surfaces outside of the regulated abatement work area using HEPA-vacuums and wet-cleaning methods shall be performed prior to collection and analysis of an additional group of outside work area clearance air samples as required by 12 NYCRR PART 56 Section 56-9.2. This recleaning/clean-up and sampling process shall be repeated until satisfactory clearance air sampling results have been achieved for all asbestos project non-exempt regulated abatement work areas throughout the entire work site.

2. The Contractor, at his/her expense, shall provide OSHA monitoring and all other all tests required by specified applicable regulations, codes, and standards and any other tests for his/her use. The use of a testing laboratory by Chappaqua CSD does not release the Contractor from providing tests required for the protection and safety of his/her employees.

3. The Contractor shall employ an independent testing laboratory for analysis of OSHA personal air monitoring samples. The laboratory used for air sample analysis shall be successfully participating in the "Proficiency Analytical Testing (PAT) Program for Laboratory Quality Control for Asbestos." The monitoring shall be supervised by an Industrial Hygienist certified by the American Board of Industrial Hygiene (A.B.I.H.). Each testing laboratory shall be ELAP (Environmental Laboratory Accreditation Program) and NVLAP (National Voluntary Laboratory Accreditation Program) certified. Chappaqua CSD shall approve the contractor's testing laboratory.

4. From each work area the Contractor, at his/her expense, shall collect and analyze OSHA personal air monitoring samples. Sampling shall be repeated during each different work activity. Sample collection and analysis shall be performed using the OSHA Reference Method as outlined in 29 CFR 1926.1101, Appendix A.

5. Results of all air monitoring performed by the Contractor shall be posted within 24 hours for regular abatement project after collection for all workers to see. A copy of the results shall be given to the Chappaqua CSD's Environmental Consultant at the same time.

6. The Contractor shall be advised whenever questions arise concerning compliance with standards of quality and completeness of the work, and shall use his/her best efforts to resolve any such questions to the satisfaction of the Chappaqua CSD's Environmental Consultant.

7. Where air monitoring tests and/or inspections are specified, the Contractor shall notify Chappaqua CSD's Environmental Consultant, in writing, 24 hours, in advance of the required test and/or inspection.

8. The Contractor is responsible for ensuring the Work is complete to the level that meets the criteria of the inspection. The Contractor shall perform an inspection of the Work to evaluate completeness prior to requesting an inspection by the Chappaqua CSD's Environmental Consultant.

C. Time Requirements for Chappaqua CSD's Environmental Consultant's Inspections and Testing: Where visual inspections or air testing is required to be performed by the Chappaqua CSD's Environmental Consultant, the Contractor shall allow for the following response/analytical time for completion of the inspection/test.

1. Where visual inspections are required, allow 24 hours, beginning from the time the Contractor's request is received by the Chappaqua CSD's Environmental Consultant, for the performance of the inspection.

2. Where TEM clearance air monitoring tests are required, allow 24 hours, beginning from the time the Contractor's written request is received by the Chappaqua CSD's Environmental Consultant, to the beginning of the air test.

PART 2 - PRODUCTS

2.01 MATERIALS:

Materials provided under this section shall be standard products of manufacturers regularly engaged in the production of the items and shall conform to OSHA Standard 29 CFR 1926.1101; EPA Standard 40 CFR 61, Subpart M; Department of Transportation Standards 49 CFR 171, 172, and 173; applicable state regulations; and requirements specified herein. Materials listed under this section "or equal" shall be provided for work under contract.

A. Plastic: Provide fire retardant plastic of 6-mil thickness shall be provided in rolls of sizes which will minimize the frequency of joints. Fire retardant plastic sheet shall be used for plasticizing the enclosed work area, for preparation of the decontamination enclosure system, and for waste packaging.

B. Reinforced Fire Retardant Plastic: Provide reinforced polyethylene sheet for the floor area of the decontamination enclosure system. Reinforced plastic sheet provided for this project shall be a 19 mil, 3-ply, high density flame resistant-reinforced-polyethylene sheet. Plastic color shall be opaque.

C. Duct Tape: Duct tape shall be capable of sealing joints of adjacent sheets of plastic and of attaching plastic sheeting to finished surfaces without damage to existing finish and shall be capable of adhering under both dry and wet conditions, including use of amended water

D. Surfactant: Surfactant (Wetting Agent) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

E. Lockdown Encapsulants: Encapsulants used after asbestos removal to lockdown fugitive fibers shall carry a Class "A" fire resistance rating and shall have an ASTM E-162 flame spread index of 15 or less. A tint shall be given to the encapsulant by means of the addition of non-toxic, nonflammable colorings before application. The encapsulant shall be installed according to the manufacturer's written instructions.

F. Caulking Sealant: Caulking sealant shall be single component, non-sag elastomer with 1600% elongation capacity. Sealant shall meet the requirements of Federal Specification TT-S-00230C, Class A Type II. Sealant shall be used to form an airtight seal around plywood barriers or temporary partitions, to seal along the seams of the decontamination enclosure system's plywood sheathing, and to seal around piping or other small penetrations of the work area. Sealant application shall be according to the manufactures written instructions.

G. Foam Sealant: Foam Sealant shall be expanding urethane Class 1 foam sealant with an Underwriters Laboratories, Inc. (U.L. 723) flame spread index of 25 or less, smoke developed index of 0, and a minimum operating temperature range between -30ºF and 250ºF.

H. Plywood: Plywood used for temporary partitions, decontamination enclosure systems, and tunnels shall be an exterior grade and a minimum 3/8-inch thick.

I. Spray Adhesive: Spray Aerosol Adhesive shall be specially formulated to stick to sheet polyethylene (3M 76, 3M 77, or equivalent).

J. Other Materials: All other materials, such as lumber, plywood, tools, scrapers, brushes, cleaning materials, adhesive, nails, hardware, etc., which are required to perform the work described in this Section shall be provided. Materials and equipment shall be new or used, uncontaminated by asbestos, in serviceable condition, and appropriate for the intended purpose.

K. Disposal Bags: Plastic Disposal Bags shall be a minimum of six mils in thickness. Bags shall be labeled in accordance with this Section.

L. Shipping Containers: Impermeable Containers shall be suitable to receive and retain any asbestos-containing or asbestos-contaminated materials until they are disposed of at an approved landfill. The containers shall be labeled in accordance with this Section. Containers shall be both airtight and watertight and conform to DOT Standard 49 CFR 178.224. Each container shall be constructed of fiber, hard plastic, or metal, with locking, airtight lids.

M. Markings and Labels: Disposal bags and shipping containers shall bear danger labels, transportation packaging labels, and generator identification information. Labels shall be permanently affixed to all bags and shipping containers containing ACM, in accordance with OSHA Standard 29 CFR 1926.1101(k)(2), DOT Standard 49 CFR Part 171 and 172, and EPA Standard 40 CFR Part 61.150(a)(1)(v).

1. Danger label format and color shall conform to OSHA Standard 29 CFR 1926.200. Danger labels shall display the following legend/information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG
DISEASE HAZARD

2. DOT Marking and Labels: Markings and labels shall be permanently affixed to all bags and containers containing ACM, in accordance with DOT 49 CFR 172.304 and 172.407.

   a. Markings shall display the following text:

      RQ, ASBESTOS, NA 2212

   b. Labels shall be diamond shape and shall be located near the Marking text. Labels will consist of a diamond a minimum of 100 millimeters (mm) on each side with each side having a solid line inner boarder 5.0 to 6.3 mm from the edge. The label shall be white with seven black vertical stripes on the top half. Black stripes and white spaces shall be equally spaced. The lower half of the label shall be white with the class number "9" underlined and centered at the bottom. Refer to DOT 40 172.446 for label format.

3. Generator identification information shall be affixed to each DOT label format and color shall conform to DOT Standard 49 CFR 172.304. Generator identification information labels shall display the following legend/information:

GENERATOR'S NAME
GENERATOR'S 24 HOUR PHONE
GENERATOR'S FACILITY ADDRESS

N. Reuse of Containers: If impermeable containers used to transport bagged asbestos waste to the landfill are to be reused, the empty containers shall display the following label:

RESIDUE:
LAST CONTAINED ASBESTOS RQ

O. Warning Signs: Warning Signs shall be posted at the perimeter of the work area prior to abatement operations in accordance with OSHA Standard 29 CFR 1926.1101. Danger sign format and color shall conform to OSHA Standard 29 CFR 1926.200. The signs shall display the legend indicated below:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS AREA

P. Mastic remover. The contractor shall use an odorless mastic remover. Manufacture and brand of mastic remover shall be approved by the Facility prior to commencing removal work.

2.02 EQUIPMENT:

Equipment provided under this section shall conform to applicable federal and state regulations, local codes, and the requirements specified herein.

A. Spraying Equipment: Equipment used to apply amended water or removal encapsulant shall be of a low pressure type to prevent disturbance of the asbestos prior to physical controlled removal. Airless spray equipment shall be provided for the application of asbestos encapsulant.

B. Vehicles: Trucks or Vans used for the transportation of asbestos waste shall be enclosed and suitable for loading, temporary storage, transit, and unloading of asbestos-contaminated waste without exposure to persons or property.

C. Fall Protection Equipment: Certified and approved equipment to be used by trained personnel when working at elevation to protect against falling from an elevated work area.

D. Fire Extinguisher: Type "ABC" dry chemical extinguisher or a combination of several extinguisher of NFPA recommended types for the fire hazard exposures in each extinguisher location shall be provided. Minimum size of extinguisher shall be 4-A, and 40-B:C. Supply a minimum of one extinguisher for every 1,000 square feet of floor area, with a maximum travel distance to an extinguisher of 75-feet. Supply at least one extinguisher in each decontamination enclosure equipment room, and clean room. Supply 2 additional extinguishers inside the work area

E. Smoke Detectors: Smoke detectors of the battery powered ionization type will be required at a rate of one per 5,000 square feet, with a minimum of one smoke detector in the decontamination enclosure clean room, and one in the work area.

F. Water Filtration System: A system capable of filtering and retaining particles larger than 5.0 microns in size shall be provided.

G. Carts: Provide water tight wheeled carts with tight fitting lids suitable for movement of non-contaminated waste or bagged asbestos waste from the decontamination enclosure system to the waste storage container or transport vehicle.

H. Power Tools: Provide power tools necessary to complete the Work. Power tools used directly for asbestos removal shall be equipped with a dust collection system. Attach a shroud connected to a HEPA vacuum system for capture of dust.

2.03 WORKER PROTECTIVE CLOTHING AND EQUIPMENT:

Protective clothing and equipment shall conform to OSHA Standard 29 CFR 1926.1101

A. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Disposable coveralls, head covers, and 18-inch high boot-type foot covers shall be constructed of material equal to DuPont "TYVEK-Type 14" or Kimberly-Clark "Kleenguard", as a minimum requirement.

1. The Contractor shall provide authorized visitors and the Chappaqua CSD's Environmental Consultant suitable properly fitting protective disposable clothing, headgear, hard hats, eye protection, respiratory protection, and footwear (up to four sets per 8-hour shift) whenever they are required to enter the work area.

B. Equipment: Eye protection and hard hats required for job conditions or by applicable safety regulations shall be provided.

C. Respiratory Protection: The Contractor shall be solely responsible for providing adequate respiratory protection at all times for all individuals in the work area. Types of respirators used shall be approved by MSHA/NIOSH for asbestos in accordance with OSHA Standard 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor shall provide a level of respiratory protection which supplies an airborne fiber level inside the respirator below 0.01 fibers per cubic centimeter (f/cc), as the minimum level of protection allowed. Determine the proper level of protection by dividing the actual airborne fiber count in the work area by the "protection factors" given below for each respirator type:

Respirator Type	Protection Factor
Air purifying: Negative-pressure respirator, High efficiency HEPA filter, Half-facepiece	10
Air purifying: Negative-pressure respirator, High efficiency HEPA filter, Full-Facepiece	50 (quantitative)
Powered air purifying (PAPR): Positive pressure respirator High efficiency HEPA filter, Full-facepiece	1000

Respirator Type	Protection Factor
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Pressure-demand, Full-facepiece equipped with an auxiliary SCBA	1000

1. The Contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.

2. During the use of supplied air systems the Contractor shall provide authorized visitors, Chappaqua CSD's Environmental Consultant, and the testing laboratory representative with individually issued and marked respiratory equipment (up to six units). Respiratory equipment shall be compatible with the supplied air system in use, and shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.

3. Where respirators with disposable filter parts are employed, the Contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.

4. Breathing air supply systems shall conform to the USEPA NIOSH Document EPA-560-OPTS-86-001 (September 1986) entitled "A Guide to Respiratory Protection for the Asbestos Abatement Industry."

5. The Contractor shall have a minimum of two spare air hoses with connectors to permit the Chappaqua CSD's Environmental Consultant or testing laboratory's representative to connect his/her assigned Type C respirator to the air system at any time without having to wait for personnel to exit the work area in order to obtain a spare hose.

3.01 DECONTAMINATION ENCLOSURE SYSTEMS:

A. Personal decontamination system enclosures shall be constructed and functional prior to commencing the regulated abatement work area preparation activities. Waste decontamination system enclosures shall be constructed and functional at the completion of preparation activities. After installation of the personal decontamination system enclosure, all access to the regulated abatement work area shall be via the installed personal decontamination system enclosure.

B. Personal Decontamination System Enclosure - Large Project.

(1) Enclosure – General. A personal decontamination system enclosure shall be provided outside the regulated abatement work area and in close proximity to all locations where personnel shall enter or exit the regulated abatement work area. One personal decontamination enclosure system for each regulated abatement work area shall be required. This system may utilize adequate existing lighting sources separate from the decontamination system enclosure, or shall be supplied with a GFCI protected temporary lighting system. The personal decontamination system enclosure shall be sized to accommodate the number of workers and equipment required for the intended purpose. Such system may consist of existing attached rooms outside of the regulated abatement work area, if the layout is appropriate, that can be plasticized and are accessible from the regulated abatement work area. When this situation does not exist, personal decontamination enclosure systems may be constructed of metal, wood or plastic supports covered with fire-retardant plastic sheeting. A minimum of one (1) layer of six (6) mil fire-retardant plastic sheeting shall be installed on the ceiling, and walls of the enclosure system. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of this area. This system must be kept clean, sanitary and climate controlled at all times in conformance with all federal, state and local government requirements. This system shall remain on-site, operational and be used until completion of Phase II C of the asbestos project.

(2) Rooms and Configuration. The personal decontamination system enclosure shall consist of a clean room, a shower room and an equipment room connected in series but separated from each other by airlocks. There shall be a curtained doorway separation between the equipment room and the regulated abatement work area, and there shall be a lockable door to the outside. (See Figure 1 within 12 NYCRR PART 56) Minimum dimensions for each airlock, shower room and equipment room shall be three (3) feet wide by six (6) feet in height, to allow for adequate access to and from the regulated abatement work area.

(3) Curtained Doorway. An assembly which consists of at least three (3) overlapping sheets of six (6) mil fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the

top and left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

(4) Framing. Enclosures systems accessible to the public shall be fully framed, hard-wall sheathed and utilize a lockable door for safety and security.

(5) Sheathing. A plywood or oriented strand board (OSB) sheathing material of at least 3/8-inch thickness.

(6) Plastic Sheeting. Enclosure systems constructed at the work site shall use at least one (1) layer of six (6) mil fire-retardant plastic sheeting on walls and ceiling. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for floor protection of this area.

(7) Prefabricated or Trailer Units. A completely watertight fiberglass or marine painted prefabricated unit does not require plasticizing. Rooms shall be configured as per paragraph (2) of this Section. All prefabricated or trailer decontamination units shall be kept in good condition, and shall be completely decontaminated after final cleaning and immediately prior to clearance air sampling. Upon receiving satisfactory clearance air results, the prefabricated units shall be sealed then separated from the regulated abatement work area and removed from the site.

(8) Clean Room. The clean room shall be sized to accommodate a full workshift of asbestos abatement contractor personnel, as well as the air sampling technician and the project monitor. The clean room shall be a minimum of six (6) feet in height. A minimum of thirty-two (32) square feet of floor space shall be provided for every six (6) full shift abatement workers, calculated on the basis of the largest work shift. If the largest work shift consists of three (3) or less full shift abatement workers, the minimum clean room size requirement is reduced to twenty-four (24) square feet of floor space. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the regulated abatement work area or enclosure and shall be used to secure the regulated abatement work area and decontamination enclosure during non-work hours.

(9) Shower Room. The shower room shall contain one (1) shower per every six (6) full shift abatement workers, calculated on the basis of the largest work shift. Multiple showers shall be simultaneously accessible (installed in parallel) to certified personnel. Each showerhead shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered

through a system with at least 5.0-micron particle size collection capability. Submersible pumps shall be installed, maintained and utilized in accordance with pertinent OSHA regulations and manufacturer's recommendations. A multi-stage filtering system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtering system by larger particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos-contaminated waste.

(10) Equipment Room. The equipment room shall be used for the storage of decontaminated equipment and tools. A one (1) day supply of replacement filters for HEPA-vacuums and negative pressure ventilation equipment in sealed containers, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A container lined with a labeled, at least six (6) mil plastic bag for collection of clothing shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

(11) Airlocks. Airlock construction shall consist of two (2) curtained doorways with three (3) alternating six (6) mil fire retardant polyethylene curtains per doorway, separated by a distance of at least three (3) feet, such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the next doorway. Minimum airlock size shall be three (3) feet wide, by three (3) feet long, by six (6) feet in height.

C. Personal Decontamination System Enclosure - Small Project

(1) Enclosure Requirements. A personal decontamination system enclosure for a Small asbestos project shall consist of, at a minimum, an equipment room, a shower room and a clean room separated from each other and from the regulated abatement work area and other areas by curtained doorways as defined in 12 NYCRR PART 56 Section 56-2.1. All other provisions for personal decontamination system for a Large asbestos project shall apply. Equipment storage, personal gross decontamination and removal of clothing shall occur in the equipment room just prior to entering the shower. (See Figure 4 in the 12 NYCRR PART 56) The full personal decontamination system enclosure specified for Large asbestos projects is recommended.

D. Remote Personal Decontamination System Enclosure. If a personal decontamination system cannot be attached to the regulated abatement work area, due to available space restrictions or other building and fire code restrictions, a remote personal decontamination system enclosure may be used for limited Special Projects as per subpart 56-11, negative pressure tent enclosure work areas with glovebag only abatement, or if non-friable ACM is being removed in a manner which will not render the ACM friable.

Limitation. If it is found during removal, that the non-friable ACM or asbestos material will become friable during the removal process, and it is logistically possible

to attach the decontamination system enclosure, abatement work must stop immediately while the remote personal decontamination system is relocated to be attached and contiguous to the regulated abatement work area.

The following requirements apply for all remote personal decontamination systems:

(1) Protective Clothing. Workers shall don two (2) sets of disposable protective clothing and a supply of protective clothing shall be kept in the airlocks attached to the regulated abatement work area.

(2) Location. The remote personal decontamination system shall be constructed as close to the regulated abatement work area as physically possible. If the remote personal decontamination system must be located at the exterior of the building/structure due to space or code restrictions, it shall be constructed within fifty (50) feet of the building/structure exit used for access by the asbestos abatement contractor personnel. The decontamination unit shall be cordoned off at a distance of twenty-five (25) feet to separate it from public areas.

(3) Airlocks. At a minimum, two (2) extra airlocks as defined in 12 NYCRR PART 56 Section 56-2.1 shall be constructed as per 12 NYCRR PART 56 Section 56-7.5(b)(11). One shall be constructed at the entrance to the equipment room or equipment/washroom. The other extra airlock shall be constructed at the entrance to the containment or regulated abatement work area(s). These airlocks shall have lockable doorways at the entrance to the airlock from uncontaminated areas. These airlocks shall be cordoned off at a distance of twenty-five (25) feet and appropriately signed in accordance with 12 NYCRR PART 56 Section 56-7.4(c). Airlocks shall not be used as a waste decontamination area and shall be kept clean and free of asbestos containing material.

(4) Designated Pathway. The walkway from the regulated abatement work area to the personal decontamination system or next regulated abatement work area shall be cordoned off and signage installed as per 12 NYCRR PART 56 Section 56-7.4(c), to delineate it from public areas while in use during Phase IIA through IID.

(5) Travel Through Uncontaminated Areas. If at any time a worker must travel through an uncontaminated area to access the personal decontamination area, the worker shall HEPA-vacuum and/or wet wipe his/her outer protective clothing while in the regulated abatement work area, then proceed into the airlock, which serves as a changing area, where he/she shall remove the outer clothing and don a clean set of protective clothing. The worker may then proceed to the personal decontamination system enclosure only along a designated pathway as described above. Travel in any other area shall not be allowed.

(6) Removal. The remote personal decontamination unit shall be removed only after satisfactory clearance air sampling results have been achieved.

E. Waste Decontamination System Enclosure - Large and Small Asbestos Projects.

(1) Enclosure – General. A waste decontamination system enclosure shall be provided outside the regulated abatement work area and shall be attached to the regulated abatement work area. One (1) waste decontamination enclosure for each regulated abatement work area shall be required. This system may utilize adequate existing lighting sources separate from the decontamination system enclosure, or shall be supplied with a GFCI protected temporary lighting system. The waste decontamination system enclosure shall be sized to accommodate the number of workers and equipment for the intended purpose. Such system may consist of existing attached rooms outside of the regulated abatement work area, if the layout is appropriate, that can be plasticized and are accessible from the regulated abatement work area. When this situation does not exist, enclosure systems may be constructed of metal, wood or plastic supports covered with fire-retardant plastic sheeting. A minimum of one (1) layer of six (6) mil fire-retardant plastic sheeting shall be installed on the ceiling, and walls of the enclosure system. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of this area. This system must be kept clean, sanitary and climate controlled at all times in conformance to all federal, state and local government requirements. This system shall remain and be used until completion of Phase II C of the asbestos project.

(2) Rooms and Configuration. A waste decontamination system enclosure shall consist of a washroom and a holding area connected in series but separated from each other by an airlock. There shall be a lockable door to the outside, and there shall be a curtained doorway between the washroom and the regulated abatement work area. (See Figure 2 in the 12 NYCRR PART 56)

(3) Curtained Doorway. An assembly which consists of at least three (3) overlapping sheets of six (6) mil fire retardant plastic over an existing or temporarily framed doorway. One (1) sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

(4) Washroom. A room/chamber between the regulated abatement work area and the holding area in the waste decontamination system enclosure, where equipment and waste containers are wet cleaned or HEPA-vacuumed. Adequate drainage and bag/container wash water shall be provided within the room/chamber, as well as a sufficient quantity of clean waste bags/containers.

(5) Equipment/Washroom Alternative. Where there is only one (1) exit from the regulated abatement work area, the holding area of the waste decontamination system enclosure may branch off from the equipment room of the personal decontamination system enclosure. The equipment room will also be used as a waste washroom. (See Figure 3 in the 12 NYCRR PART 56)

(6) Plastic Sheeting. Waste decontamination system enclosures constructed at the work site shall use at least one (1) layer of six (6) mil fire-retardant plastic sheeting on walls and ceiling. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of these areas.

(7) Enclosure Security. The waste decontamination system enclosure and regulated abatement work area airlock(s) (when remote decontamination systems are used) shall be constructed with lockable doors to prevent unauthorized entry. Enclosures systems located within twenty-five (25) feet of an area of public access shall be fully framed and hard-wall sheathed for safety.

(8) Drains. The waste washroom shall be equipped with a wash bin of sufficient size to perform waste container washing operations and shall have a submersible pump installed to collect waste water and deliver it to the shower wastewater filtration system where it shall be filtered in accordance with paragraph (b)(9) of this Section.

(9) Shower/Washroom Alternative - Small Asbestos Project. For Small asbestos projects with only one (1) exit from the regulated abatement work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall be immediately removed from the enclosure. Waste shall

be transferred only during times when the showers are not in use. (See Figure 4 in this Section)

F. Waste Decontamination System Enclosure – When Remote Personal Is Allowed. When a remote personal decontamination system enclosure is allowed and utilized for a regulated abatement work area, the following requirements shall apply:

(1) Minor Size Regulated Abatement Work Area. No specific waste decontamination system enclosure is required for minor size regulated abatement work areas. The waste generated shall be immediately bagged/containerized within the regulated abatement work area.

(2) Small & Large Size Regulated Abatement Work Areas.

(i) Washroom. An additional chamber shall be constructed within the regulated abatement work area, attached to the existing airlock used to access the work area. The washroom/airlock combination shall be utilized as the contiguous waste decontamination enclosure for waste bagging/containerization and waste transfer activities. The washroom shall be constructed and supplied with equipment/materials consistent with waste decontamination system enclosure washroom requirements for contiguous personal and waste decontamination system enclosures.

(ii) Removal. The washroom chamber shall be removed only after satisfactory clearance air sampling results have been achieved

3.02 PERSONNEL PROTECTION AND DECONTAMINATION PROCEDURES:

A. General: The Contractor shall take all safety measures and precautions necessary to protect his/her employees and building occupants in accordance with OSHA Standard 29 CFR 1926, EPA Standard 40 CFR, Part 61, Subpart M, and applicable state and city regulations. The Contractor shall be solely responsible for enforcing personnel protection requirements.

1. After the installation of the personal decontamination system, full PPE in compliance with current OSHA regulations shall be worn in regulated abatement work areas during preparation activities, for all friable OSHA Class I or Class II asbestos projects. Asbestos abatement contractor’s respirator selection, filter selection, medical surveillance and respiratory training must be consistent with current OSHA regulations. Appropriate respiratory protection is also required of all authorized visitors.

2. Workers or authorized visitors shall not eat, smoke, drink, or chew gum or other substances while in the work area(s) or decontamination area(s).

3. Contaminated worker footwear, eye protection, and hard hats shall be stored in the equipment room when not in use in the work area and, upon completion of asbestos abatement, disposed of as asbestos-contaminated waste or decontaminated for reuse.

4. Entry to the personal and waste decontamination system enclosures shall be restricted to the asbestos contractors involved with the asbestos project, appropriately certified employees of the asbestos contractors, authorized visitors, police, fire and other public safety personnel.

5. Asbestos workers shall not wear any jewelry; e.g. watch, necklace, etc. while in the work area or decontamination area.

B. Worker Respiratory Protection: With approval from the Chappaqua CSD's Environmental Consultant, historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for the time interval prior to the Contractor establishing the eight-hour time weighted average (TWA) for an abatement task. Historical data provided by the Contractor shall be based on OSHA personal air monitoring of the "breathing zone" of his/her employees for other asbestos abatement projects, and the data were obtained during work operations conducted under work place conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations. Documentation of aforementioned results shall be presented to the Chappaqua CSD’s Environmental Consultant for review of applicability. (See "Submittal, Pre-Project

Information." This will not relieve the Contractor in providing personal air monitoring to determine the TWA for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101. After the TWA is established, the Contractor may provide respirators as presented in the Specification. The minimum level of protection for TSI and/or Surfacing Materials abatements is full face-piece Powered Air Purifying Respirator (PAPR).

1. Review safety data sheets (SDS) for products to be used during the work. Follow recommendations as given by the product manufacturer for personnel protection required to be worn during product application.

2. Personal Air Monitoring Requirements: The Contractor's CIH shall be responsible for development and implementation of a personal air monitoring program in accordance with OSHA Standard 29 CFR 1926.1101, good industrial hygiene practices, and the requirements herein. Personal air monitoring shall be performed by an independent testing laboratory and supervised by the Contractor's CIH. Documentation of air sampling shall include as a minimum, calculations of minimum sample volume to achieve necessary detection limits; sampling time; sampling location (or subject); evidence of periodic inspection of sampling equipment; documentation of daily pre- and post-calibration of sampling equipment; detailed description of worker protective devices; description of any typical environmental conditions; and a description of work practices/procedures/controls in operation during the sampling period. Documentation of sample analysis shall include, as a minimum, sample identification; total sample duration, sample flow rate; the "Limit of Reliable Quantification"; total air volume; total fibers counted (with work sheets); total fields counted; blank filter analysis; and reticule field area. Airborne fiber concentrations in fibers per cubic centimeter (f/cc) shall be calculated and reported at the 95 percent confidence level.

3. Full-shift personal exposure air sampling of workers shall be performed to establish the 8-hour (TWA) exposure. Such sampling shall be conducted for each employee (or representative group of employees, at least one sample per eight man crew) expected to evidence the highest exposure in each work area for each type of activity on the first shift that site preparation, removal, or cleanup activities occur. Similarly, 30-minute personal exposure air sampling shall be conducted during activities anticipated to produce the highest airborne concentrations to determine the Excursion Limit. Personal exposure sampling shall be repeated everyday as per protocol requirements where removal and cleanup operations are conducted for the duration of the project, or at any time that conditions indicate to the Contractor or the Contractor's CIH that the most recent personal sampling results are no longer indicative of employee exposure. PCM personal samples shall be collected and analyzed according to the OSHA Reference Method in OSHA Standard 29 CFR 1926.1101, Appendix B.

C. Personnel Entrance and Decontamination Procedures for entering and exiting a Regulated Abatement Work Area:

The following entry/exit procedures shall be used for gross removal:

1. All workers and authorized visitors shall enter the work area through the worker decontamination enclosure system.

2. All individuals who enter the work area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each work area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity.

3. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator (with new filters, if appropriate) and clean protective clothing before entering the work area through the shower room and equipment room.

4. Each worker or authorized visitor shall, each time he/she leaves the work area: remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove all clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

5. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the work area is not permitted outside the work area.

3.03 PREPARATION OF WORK AREA:

The following Paragraph "General Preparations" outlines procedures applicable to all work areas. Work procedures specific for preparing each asbestos removal area is addressed in its respective Subparagraph. If a site specific variance is approved, procedures outlined in the variance will supercede this specification.

A. General Preparations: The following general preparations shall be used for all work areas being abated:

1. Erect barricades; post notices and warning signs.

2. Provide and install decontamination enclosure systems in accordance with Article 3.01, "Decontamination Enclosure Systems" of this Section.

3. Seal drains and other collection devices with 6-mil plastic and plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.

4. Ensure that the Contractor's approved Fall Protection Equipment (if applicable) is in place, in operating condition, and in operation during work described in this section.

5. Maintain emergency and fire exits from the work areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the work area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

6. Temporary lighting within the work area and decontamination system shall be provided as required to achieve minimum illumination levels.

7. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be equipped by manufacture with HEPA filtered local exhaust ventilation.

8. Hot and cold water may not be available in all work areas. In such cases sufficient heating equipment shall be provided to maintain a necessary supply of hot water for showers.

B. Interior Negative Pressure Tent Enclosure:

1. Tent enclosure work areas shall at a minimum have decontamination areas installed and utilized.

2. Tents with greater than twenty (20) square feet of floor space, that are scheduled for gross removal of friable ACM, PACM, or asbestos material, shall be constructed of two (2) layers of six (6) mil fire-retardant plastic sheeting and shall include walls, ceiling and a floor (except for portions of walls, floors and ceilings that are the removal surface) with double folded seams. Seams shall be duct taped airtight and then duct taped flush with the adjacent tent wall.

3. Tents with no gross removal of friable ACM, PACM or asbestos material, shall be constructed of one (1) layer six (6) mil fire-retardant plastic sheeting and shall include walls, ceiling and a floor (except for portions of walls, floors and ceilings that are the removal surface) with double –folded seams. Seams shall be duct taped airtight and then duct taped flush with the adjacent tent wall.

4. Tents or tent-like structures or enclosures shall be adequately supported and

reinforced to withstand local environmental conditions and the negative pressures developed within them.

5. An airlock shall be constructed as per Section 56-7.5(b)(11), at the entrance to each tent that utilizes remote decontamination system facilities. Each tent and airlock shall be cordoned off twenty-five (25) feet from it perimeter, or the interior space/room where the tent and airlock is located shall be secured from non-certified personnel or public access, and signage shall be installed as per Section 56-7.4(c).

6. All electric power in the work area shall be shut down and locked out. In

   a) the event this is not possible as per 56-7.7 (c), the live electric shall be maintained within those conduits, cables, panels and boxes as per following conditions: All live cables, electrical panels and boxes that run through the work areas shall be wrapped with three (3) layers of 6-mil plastic sheeting. Each layer shall be individually taped and sealed separately. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air monitoring results have been obtained.

   b) Any energized circuits remaining in the work areas shall be posted with a two (2) inch high lettering warning sign which reads: DANGER-LIVE ELECTRICAL-KEEP CLEAR. The sign shall be placed on all live covered barriers at maximum of (10) ten-foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work areas of the existence of the energized circuits.

   c) All electrical power for the removal project shall be brought into the work area through a separate GFCI panel box located outside the work area.

7. Manometers consistent with the requirements of Section 56-7.8(a)(4), are required for negative pressure tent enclosure regulated abatement work areas with OSHA Class I 12 NYCRR 56 Subpart 7, Page 69 abatement. 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. If a HEPA-filtered vacuum is used for a Minor size abatement tent enclosure work area to maintain the required air changes, after final cleaning is completed twenty (20) minutes shall elapse, then ventilation may be stopped, clearance air samples collected if required, and the tent sealed until results are read. If air sample results are unacceptable, ventilation shall be re-established, the area recleaned and new samples taken.

8. A four (4) hour pre-abatement settling period is required prior to commencement of ACM removal activities.

B. Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs.

1. 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. 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 of 12 NYCRR Part 56. 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.

   a. 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

2. 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 of 12 NYCRR Part 56.

3. Decontamination System Location. The personal 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) of 12 NYCRR Part 56.

4. Critical Barriers. Prior to the placement of critical barriers, affected surfaces shall be pre-cleaned using HEPA-filtered vacuum equipment and wet cleaning methods. All openings within the regulated abatement work area shall be sealed with critical barriers installed as per Section 56-7.11(a) of 12 NYCRR Part 56, prior to beginning Phase II B activity on the project. The critical barriers shall be removed only after satisfactory clearance air sampling results have been obtained or the asbestos project is complete. The 12 NYCRR 56 Subpart 11, Page 106 requirements of Section 56-7.11(b-e) do not apply.

3.04 PRE-REMOVAL INSPECTIONS:

A. Prior to removal of any ACM the Contractor shall notify the Chappaqua CSD's Environmental Consultant and request a pre-removal inspection. Posting of warning signs, plasticizing of work area, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of Chappaqua CSD's Environmental Consultant. The Contractor shall not begin asbestos removal until the Chappaqua CSD's Environmental Consultant approves the work area preparations.

3.05 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS:

A. Repair damaged barriers and remedy any defects immediately upon their discovery. Visually inspect barriers at the beginning and end of each work period.

B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of twice each 8- hour work shift.

C. Ensure that both hot and cold water exist in sufficient supply for the decontamination enclosure system.

3.06 REMOVAL OF ASBESTOS-CONTAINING MATERIAL:

The Asbestos Contractor shall be responsible for the proper removal of ACM from the Work Area using standard abatement industry removal techniques. The Environmental Consultant or their representative shall observe the Work. Approval of the Asbestos Contractor’s abatement techniques is required by the Environmental Consultant to allow for the continuance of work.

A. Removal of asbestos containing materials in Negative Pressure Tent Enclosures and Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs work areas:

1. Materials removed shall be containerized or immediately wrapped in two (2) layers of six (6) mil fire retardant plastic sheeting and secured airtight prior to removal from the regulated work area and transport to the waste decontamination facility. Residual asbestos containing materials shall be wet scraped, HEPA vacuumed or otherwise collected by manual means and likewise containerized and secured airtight prior to removal from the regulated work area and transported to the waste decontamination facility.

2. Asbestos containing materials will not be allowed to accumulate in the work area

B. Additional Removal Requirements:

1. Chappaqua CSD's Environmental Consultant shall issue a stop work order if visible emissions are detected outside the work areas and/or should the fiber count in adjacent non-work areas exceed 0.01 f/cc of air or the background count (use the greater of these two values as the reference). Work shall not resume until the condition(s) causing the increase are corrected, surfaces outside of the work area are decontaminated using HEPA vacuums or wet cleaning techniques and the Contractor receives written notice from Chappaqua CSD's Environmental Consultant.

3.07 ACM WASTE PACKAGING AND LOAD OUT PROCEDURES:

A. Packaging of ACM shall conform to OSHA Standard 29 CFR 1926.1101, DOT 49 CFR 171,172, and 173, EPA Standard 40 CFR Part 61, New York City Department of Sanitation (in relation to transport, storage, and disposal of ACM) and the requirement as heretofore specified. ACM waste shall be placed in a wet condition into properly labeled disposal bags or sealed in two layers of 6-mil plastic sheeting wrapped airtight and properly labeled. Materials to be transported through a non-Work Area building space shall be placed in hard wall shipping containers for handling. Specific requirements for decontamination of waste containers, and load out through the decontamination enclosure systems is outlined below:

B. Frequency of Waste Removal: Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site. The waste hauler and landfill shall be as indicated on the notifications to regulatory agencies.

C. Waste Load-out Through Waste Decontamination Unit: Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick plastic sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil plastic sheeting, as the item’s physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.

D. The clean containerized items shall be moved directly to the Waste Hauler’s truck pending load-out to storage or disposal facilities.

E. Workers who have entered the decontamination enclosure system from the uncontaminated non-work area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.

F. Thoroughly clean the decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

G. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, whether turned inside out or not, shall be handled and disposed of as ACM waste.

3.08 CLEANUP AND CLEARANCE TESTING OF WORK AREAS:

The following cleanup procedures shall be performed during abatement.

A. 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.

B. 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.

C. Interior Negative Pressure Tent Enclosure removal methods:

1. All accumulations of asbestos waste material shall be containerized and removed. HEPA-vacuums shall be used to clean all surfaces after gross removal.

2. Contaminated equipment and all containerized waste shall be removed from the regulated abatement work area.

3. All surfaces in the regulated abatement work area shall be wet-cleaned using rags, mops or sponges.

4. Negative pressure HEPA-ventilated air equipment shall operate until final clearance is achieved.

5. Once final cleaning is complete, a visual inspection shall be completed by the asbestos abatement contractor’s supervisor to confirm that the scope of abatement work for the asbestos project is complete, and no visible debris/residue, pools of liquid, or condensation remain.

6. The appropriate post-abatement settling/drying period will be observed, depending on the type and quantity of material remove, prior to commencement of final clearance air sampling.

7. When the work area receives passing final clearance air sampling results, all controls and seals of the work area may be broken down.

D. Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs removal methods.

1. 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.

2. 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.

3. Final Cleaning and Clearance Procedures. 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.

3.09 DISPOSAL AND TRANSPORTATION OF ASBESTOS-CONTAMINATED WASTE:

A. Storage of Containerized ACM: As the work progresses, remove sealed and labeled bags of ACM from the Work Area and place in a lockable trailer, dumpster, or other container approved for storage or transport of asbestos waste. The waste container shall be lined with two layers of 6-mil fire retardant plastic on all sides. Asbestos-containing waste shall remain under the positive control of the Asbestos Contractor and must never be left unattended in an area or on a vehicle where unauthorized persons could gain access. Containerized ACM shall be removed from the site on a daily basis. Unless specifically approved in writing by the Owner, ACM shall not be permitted to be stored on site during non-working hours.

B. Sealed and labeled bags or waste wrapped in two layers of plastic sheeting sealed airtight shall be used to transport asbestos-contaminated waste to the landfill. Procedures for hauling and disposal shall comply with 40 CFR, Part 61, 49 CFR, Part 171 and 172, and other applicable state, regional, and local government regulations. Procedures for removal from the Work Area and disposal of waste are outlined below:

C. A properly completed and original "Waste Shipment Record" form shall accompany asbestos waste, which is transported to a disposal site. This form shall be signed and dated by each party who has control over the asbestos waste, and a copy retained by each party as responsibility for the waste is transferred to the next party. All original manifest forms and waste receipts shall be provided to the Architect. The Environmental Consultant shall be provided with copies of all waste manifests.

D. Trucks hauling asbestos waste shall be totally enclosed to prevent loss or damage to waste container en-route to approved landfill. The interior of the vehicles shall be lined with two layers of 6-mil plastic.

E. Mark with a visible warning sign during the loading and unloading of asbestos-containing waste all vehicles used to transport the waste material. Danger sign

legend, text size, style and arrangement shall conform to the requirements of EPA Standard 40 CFR Part 61.149 (d) (I).

F. Only sealed plastic bags or completely sealed items shall be deposited in landfill. Damaged, broken sealed windows or leaking plastic bags shall be resealed prior to being deposited in the landfill. Workers shall place asbestos waste in the landfill. Throwing or dumping of containers shall not be allowed. Workers unloading and handling the sealed bags/drums at the disposal site shall wear appropriate personnel protective equipment including respirators and protective clothing.

G. After the vehicle is unloaded at the landfill, the plastic sheeting that was taped to the floor, sides and top of the truck shall be carefully removed and placed in properly labeled bags for disposal with the rest of the waste.

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Pre-Project Submittal:		
1. Insurance	_____	_____
2. All required bonds	_____	_____
3. List of Subcontractors	_____	_____
4. Health and Safety Plan	_____	_____
5. Proof that all required permits and variances have been obtained	_____	_____
6. Documentation of Required Qualifications of Workers	_____	_____
7. Proof of a respiratory protection program.	_____	_____
8. Proof of historic airborne fiber data.	_____	_____
9. Proof that a landfill site has been located.	_____	_____
10. SDS of chemicals to be used on this project.	_____	_____
11. Asbestos Removal and Disposal Work Plan	_____	_____
During Work Submittal:		
1. Schedule of Work Changes	_____	_____
2. Notarized copy of weekly payroll showing a prevailing wage rate has been paid.	_____	_____
A "Request For Services" form.	_____	_____
3. Results of all air monitoring performed by the Contractor (OSHA)	_____	_____

SUBMITTAL	DATE SUBMITTED	DATE
4. A certified, signed, and completed copy of each " Waste Shipment Record" form (Section 1.07)	_____	_____
5. A copy of the bound log book	_____	_____

Post Project Submittal:

1. A notarized "Release of Liens"	_____	_____
2. Proof of payment of prevailing wage rate	_____	_____
3. Notarized copies of a daily log.	_____	_____
4. Compilation in chronological order of all air monitoring records pertaining to this project.	_____	_____
5. Compilation of all completed and signed Waste Shipment Record forms.	_____	_____
6. Copies of notifications to applicable agencies.	_____	_____
7. Paid invoice verifications for sub-contractor (for Time and Material job), service contract agreement, insurance certificates, copies of the workers licenses, and other required submittals.	_____	_____

DRAWINGS

ASBESTOS ABATEMENT
GENERAL NOTES

GENERAL NOTES:

1. ALL ASBESTOS REMOVAL SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAW, GUIDELINES, REGULATIONS, ORDERS AND DIRECTIVES, INCLUDING WITHOUT LIMITATIONS, THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), AND U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH), AND NEW YOK STATE DEPARTMENT OF LABOR (NYSDOL).

2. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, ETC., NECESSARY TO PERFORM THE WORK REQUIRED FOR ASBESTOS ABATEMENT IN ACCORDANCE WITH CONTRACT DOCUMENTS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

3. CONTRACTOR SHALL DEVELOP AND IMPLEMENT A WRITTEN STANDARD PROCEDURE FOR ABATEMENT WORK TO ENSURE MAXIMUM PROTECTION AND SAFEGUARD FROM ASBESTOS EXPOSURE OF THE WORKERS, VISITORS, EMPLOYEES, GENERAL PUBLIC, AND THE ENVIRONMENT.

4. CONTRACTOR SHALL PROVIDE SIGNS, LABELS, WARNINGS, AND POST INSTRUCTIONS THAT ARE NECESSARY TO PROTECT, INFORM AND WARN PEOPLE OF THE HAZARD FROM ASBESTOS EXPOSURE. POST IN A PROMINENT AND CONVENIENT PLACE FOR THE WORKERS A COPY OF THE LATEST APPLICABLE REGULATIONS FROM OSHA, EPA, NIOSH AND NYSDOL.

5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATION.

6. THE CONTRACTOR SHALL RELOCATE ALL FURNITURE, LOCKERS, DESKS AND OTHER MISC. ITEMS IN AND OUT OF THE WORK AREAS TO ACCOMODATE ASBESTOS ACTIVITIES, IF THE SCHOOL DOES NOT PROVIDE.

7. THE CONTRACTOR SHALL PROVIDE ALL ELECTRICAL, WATER, AND WASTE CONNECTIONS, TIE–INS, EXTENSIONS, CONSTRUCTION MATERIALS, SUPPLIES, ETC. AS REQUIRED TO FACILITATE ASBESTOS REMOVAL, IF THE SCHOOL DOES NOT PROVIDE.

8. CONTRACTOR SHALL PROVIDE TEMPORARY ELECTRIC AND LIGHT THROUGHOUT THE WORK AREA(S) AS REQUIRED IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND CODES.

9. CONTRACTOR SHALL PROPERLY PROTECT ALL CONTROLS, TUBING, ELECTRICAL PANELS, EQUIPMENT, ETC. WITHIN THE WORK AREA.

10. THE CONTRACTOR SHALL BE REQUIRED TO ISSUE NON–WHITE WORK COVERALLS FOR ALL ABATEMENT WORKERS.

11. CONTRACTOR SHALL EXERCISE EXTREME CARE AND CAUTION DURING ANY AND ALL DEMOLITION AND ABATEMENT OPERATIONS. CONTRACTOR SHALL CONDUCT REMOVAL OF ALL MATERIALS FROM THE SITE WITH MINIMUM DISTURBANCE; PROVIDE PROPER PROTECTION AND REGULAR MAINTENANCE OF ALL BUILDING PREMISES DIRECTLY OR INDIRECTLY ASSOCIATED WITH ABATEMENT OPERATIONS.

12. THE CONTRACTOR SHALL USE A WATER SPRAYER TO WET ASBESTOS CONTAINING MATERIALS INSIDE THE WORK AREA.

13. CONTRACTOR SHALL CONSTRUCT A PERSONAL/WASTE DECONTAMINATION ENCLOSURE SYSTEM (P./W.D.E.S.) AS INDICATED. IT SHALL BE OF SUFFICIENT SIZE TO ACCOMMODATE STORAGE OF MATERIALS, EQUIPMENT, ETC.

14. IF WATER IS NOT AVAILABLE, THE CONTRACTOR SHALL PROVIDE A 55 GALLON WATER TANK FOR THE DECONTAMINATION UNIT.

15. THE CONTRACTOR SHALL UTILIZE GFCI PANEL CONNECTIONS AT THE SOURCE OUTLET WHEN ACCESSING TEMPORARY POWER.

16. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE TEMPORARY WATER AND POWER SOURCES PRIOR TO ABATEMENT ACTIVITIES.

17. DEBRIS RESULTING FROM ANY DEMOLITION AND/OR ASBESTOS ABATEMENT ACTIVITIES SHALL BE DISPOSED OF AS ASBESTOS CONTAMINATED WASTE.

18. NO WASTE SHALL BE STORED ON SITE OR INSIDE THE DECONTAMINATION UNIT BETWEEN SHIFTS. WASTE SHALL BE DOUBLE BAGGED BEFORE PROCEEDING TO THE CONTAINER AND/OR DECON. BAGS WILL BE MOVED FROM WORK AREAS TO THE WASTE DECON AND SUBSEQUENTLY TO THE CONTAINER IN COVERED CARTS. BAGS WILL BE CARRIED BY HAND ONLY WHEN NECESSARY. ALL WASTE SHALL BE CONTAINERIZED AT THE END OF EACH WORK SHIFT BEFORE RELINQUISHING TO WASTE HAULER.

19. CONTRACTOR IS RESPONSIBLE TO COORDINATE AND CONFIRM THE EXACT SCOPE OF WORK, AND QUANTITY FOR EACH PHASE OF ABATEMENT WITH THE GENERAL CONTRACTOR AND OTHER TRADES.

20. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, TOOLS, TRANSPORTATION AND ANY OTHER EQUIPMENT REQUIRED AND/OR NECESSARY TO COMPLETE ALL WORK DESCRIBED IN THE CONTRACT DOCUMENTS.

21. CONTRACTOR'S RESPONSIBLE FOR ALL FALL PROTECTION, SAFETY, ETC. TO ACCESS THE PITCHED SLATE ROOF. PROTECTION FOR SLATE ROOF MAY BE NEEDED.

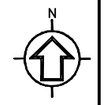
DRAWING	DRAWING NAME
H-001.00	ASBESTOS ABATEMENT - GENERAL NOTES
H-002.00	ASBESTOS ABATEMENT - FIRST FLOOR PLAN
H-003.00	ASBESTOS ABATEMENT - THIRD FLOOR/ATTIC PLAN
H-004.00	ASBESTOS ABATEMENT - ROOF PLAN

Designer
Expiration
12/31/2024

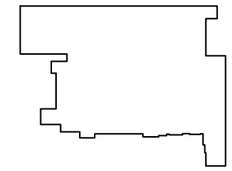
STATE OF NEW YORK ★ ROBERT SCOTT MASONE ★ 084951 ★ LICENSED PROFESSIONAL ENGINEER

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

KEY PLAN



Key Plan
Robert E. Bell Middle School



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CHAPPAQUA Central School District

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

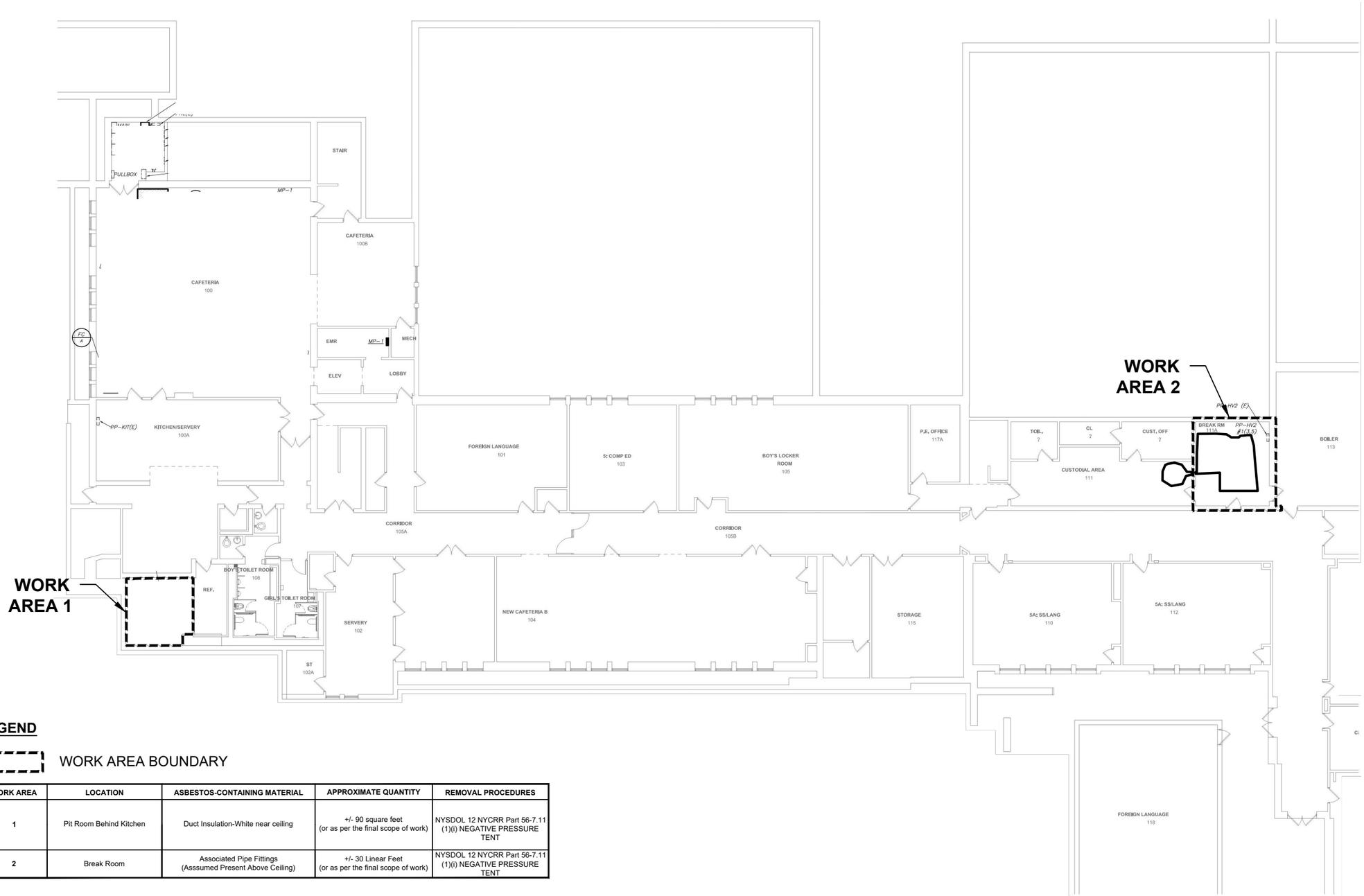
ROBERT E. BELL
MIDDLE SCHOOL
50 CENTER STREET
CHAPPAQUA, NY 10514

DRAWING TITLE:
ASBESTOS ABATEMENT
GENERAL NOTES

DRAWN BY:	D RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	H-001.00

DRAWING NUMBER: 1 of 4

CONSULTANTS PROJECT #: 101134406



LEGEND

WORK AREA BOUNDARY

WORK AREA	LOCATION	ASBESTOS-CONTAINING MATERIAL	APPROXIMATE QUANTITY	REMOVAL PROCEDURES
1	Pit Room Behind Kitchen	Duct Insulation-White near ceiling	+/- 90 square feet (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-7.11 (1)(i) NEGATIVE PRESSURE TENT
2	Break Room	Associated Pipe Fittings (Asssumed Present Above Ceiling)	+/- 30 Linear Feet (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-7.11 (1)(i) NEGATIVE PRESSURE TENT

1 FIRST FLOOR PLAN
SCALE: NTS

Designer
Expiration
12/31/2024

STATE OF NEW YORK ROBERT SCOTT MASONE 084951 LICENSED PROFESSIONAL ENGINEER

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

KEY PLAN

Key Plan
Robert E. Bell Middle School

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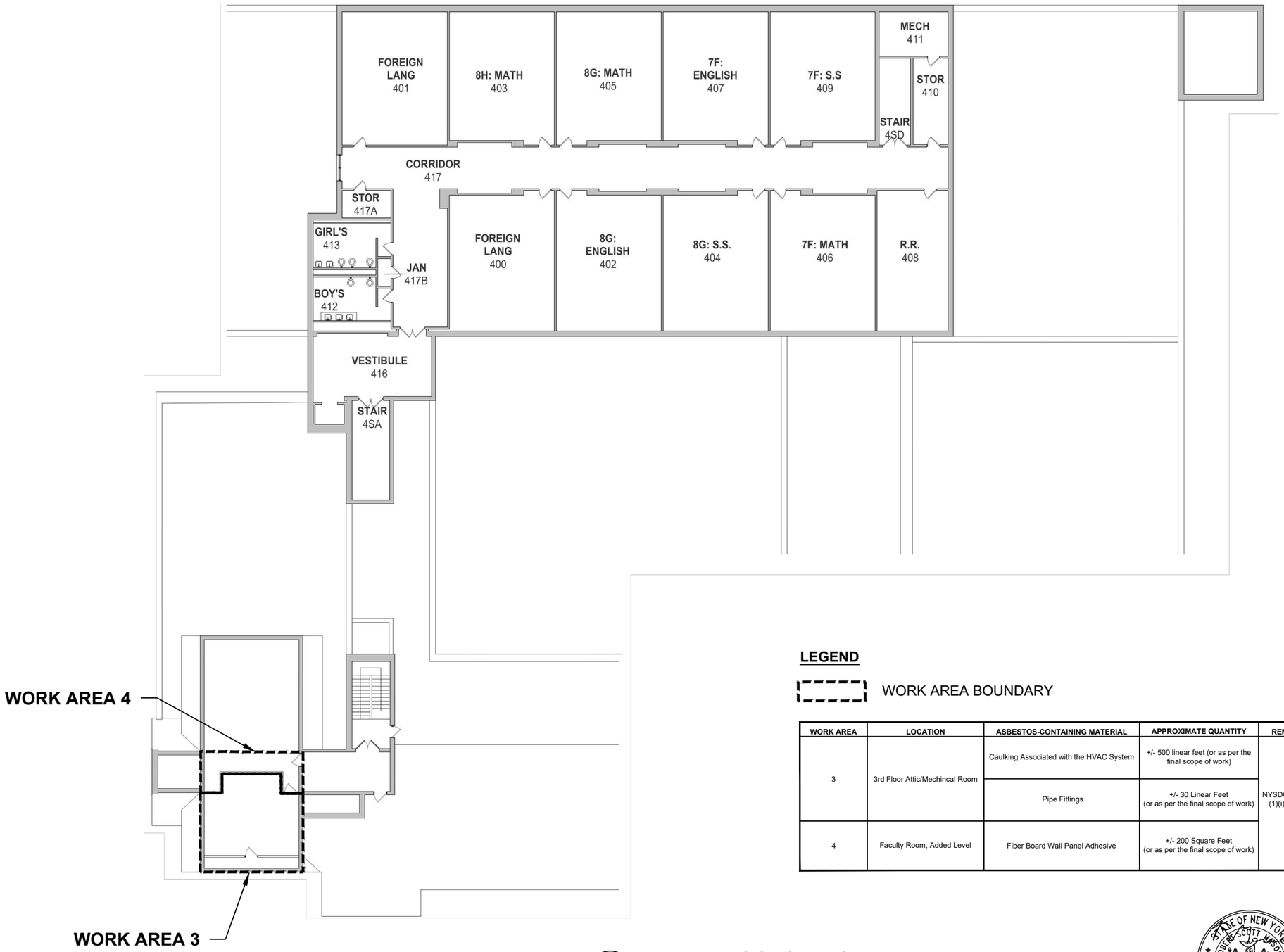
ROBERT E. BELL MIDDLE SCHOOL
50 CENTER STREET
CHAPPAQUA, NY 10514

DRAWING TITLE:
ASBESTOS ABATEMENT FIRST FLOOR PLAN

DRAWN BY:	D RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	H-002.00

DRAWING NUMBER: 2 of 4

CONSULTANTS PROJECT #: 101134406



2 THIRD FLOOR/ATTIC PLAN

SCALE: NTS

LEGEND

WORK AREA BOUNDARY

WORK AREA	LOCATION	ASBESTOS-CONTAINING MATERIAL	APPROXIMATE QUANTITY	REMOVAL PROCEDURES
3	3rd Floor Attic/Mechincal Room	Caulking Associated with the HVAC System	+/- 500 linear feet (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-7.11 (1)(i) NEGATIVE PRESSURE TENT
		Pipe Fittings	+/- 30 Linear Feet (or as per the final scope of work)	
4	Faculty Room, Added Level	Fiber Board Wall Panel Adhesive	+/- 200 Square Feet (or as per the final scope of work)	

Designer
Expiration
12/31/2024

STATE OF NEW YORK ROBERT SCOTT MASONE 084951 LICENSED PROFESSIONAL ENGINEER

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

KEY PLAN

Key Plan
Robert E. Bell Middle School

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ROBERT E. BELL MIDDLE SCHOOL
50 CENTER STREET
CHAPPAQUA, NY 10514

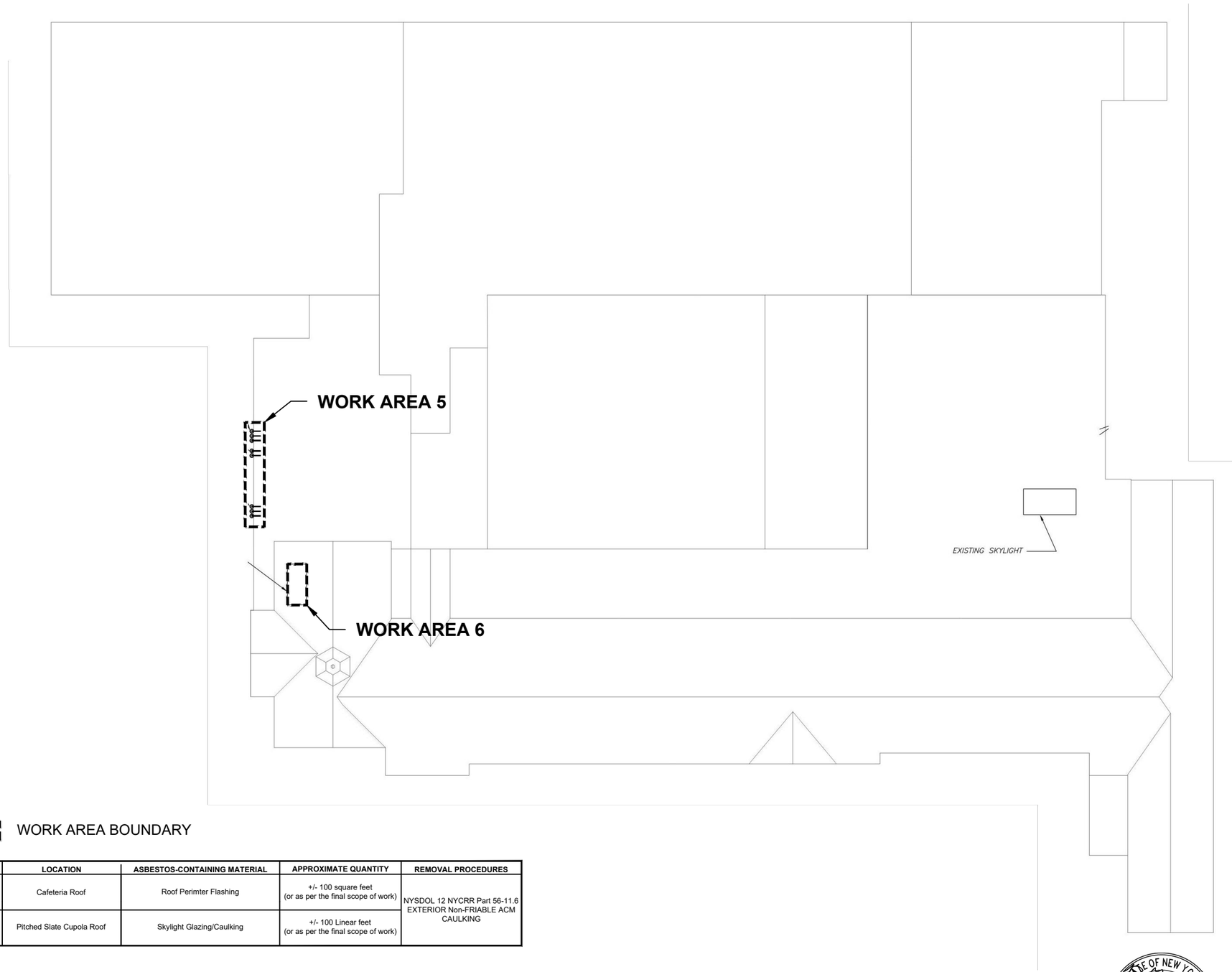
DRAWING TITLE:

ASBESTOS ABATEMENT THIRD FLOOR/ATTIC PLAN

DRAWN BY:	D RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	H-003.00

DRAWING NUMBER: 3 of 4

CONSULTANTS PROJECT #: 101134406



LEGEND

WORK AREA BOUNDARY

WORK AREA	LOCATION	ASBESTOS-CONTAINING MATERIAL	APPROXIMATE QUANTITY	REMOVAL PROCEDURES
5	Cafeteria Roof	Roof Perimter Flashing	+/- 100 square feet (or as per the final scope of work)	NYSDOL 12 NYCRR Part 56-11.6 EXTERIOR Non-FRIABLE ACM CAULKING
6	Pitched Slate Cupola Roof	Skylight Glazing/Caulking	+/- 100 Linear feet (or as per the final scope of work)	

3 ROOF PLAN
SCALE: NTS

Designer
Expiration
12/31/2024

STATE OF NEW YORK
ROBERT SCOTT MASONE
084951
LICENSED PROFESSIONAL ENGINEER

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

KEY PLAN

Key Plan
Robert E. Bell Middle School

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CHAPPAQUA Central School District

REVISIONS:

NUMBER	DESCRIPTION	DATE
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ROBERT E. BELL MIDDLE SCHOOL
50 CENTER STREET
CHAPPAQUA, NY 10514

DRAWING TITLE:
ASBESTOS ABATEMENT ROOF PLAN

DRAWN BY:	D RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO		

DRAWING NUMBER:
H-004.00

DRAWING NUMBER:
4 of 4

CONSULTANTS PROJECT #: 101134406

HAZMAT ABATEMENT WORK PLAN

for

Horace Greeley High School
70 Roaring Brook Road
Chappaqua, New York

Prepared For:

Chappaqua Central School District
66 Roaring Brook Road
Chappaqua, NY 10514

Prepared By:

Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C.
1 North Broadway
White Plains, New York 10601

LANGAN

October 7, 2024
101134406

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H-003.00 Asbestos Abatement – Gymnasium Floor Plan (Building A)

SECTION 020811

ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The asbestos abatement contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. The asbestos abatement contractor is responsible for the confirmation of the actual total quantities of the Work. The asbestos abatement contractor shall provide all labor, equipment and materials necessary to complete the Work in accordance with the Contract Documents. All asbestos material is to be disposed of as ACM waste. Quantities indicted below are confirmed asbestos.

B. This work plan has been developed to comply with the regulations under Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (Cited as 12 NYCRR Part 56), Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(b)(4), Hazardous Waste Operations and as per contract documents and specifications.

Horace Greeley High School
70 Roaring Brook Road, Chappaqua, New York 10514

1. Drawing H-002.00: Roof Plan (Building L)

Work Area #	**Location**	**Asbestos-Containing Material**	**Approximate Quantity**	**Removal Procedure**
1	Building L – Roof	Tar Paper/Mastic on Metal Deck (bottom layer under 12” of roofing materials)	+/- 1,000 SF (amount to be determined by scope of work/what is needed to abated)	NYSDOL 12 NYCRR Part 56-11.6 Exterior Removal of Non-Friable ACM Roofing

2. Drawing H-003.00: Gymnasium Floor Plan (Building A)

Work Area #	Location	Asbestos-Containing Material	Approximate Quantity	Removal Procedure
2A	Building A, Main Gym, Near Ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE (on scaffolding near ceiling)
2B	Building A, Main Gym, Near Ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	
2C	Building A, Main Gym, Near Ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	
3	Building A, Main Gym Mechanical Room	Pipe Insulation/Fittings	150 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE
		Duct Insulation Coating, White/Gray	‘+/- 500 SF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-7 FULL CONTAINMENT/ SEQUENTIAL REMOVAL
		Duct Insulation Pin Mastic, Black		
4A	Building A, Small Gym	Pipe Insulation/Fittings/Roof Drain Insulation (4 locations)	40 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE (on scaffolding near ceiling)
4B	Building A, Fitness Center	Pipe Insulation/Fittings	15 LF (amount to be determined by actual scope of work as needed)	

B. The Contractor is responsible for completing all notifications and variances required to meet the determined start date (if applicable).

C. If asbestos containments are required, the Contractor shall establish the asbestos containments so as to not interfere with operation of or access to the temporary equipment that shall be installed by others.

D. The Contractor shall field verify the amount of ACM and familiarize him/her-self with all variable field conditions in the building before the submission of his/her quote. The quantities presented in this specification are approximate only and should not be used solely as the basis for any quote. Any discrepancies or difference in the approximate and actual quantities shall be resolved before the award of any Contract. No change order relative to ACM material quantity will be permitted after the award of the Contract, unless new areas are added. In the event that suspect materials not included in this Specification are encountered while the work is in progress, such material shall be tested and, if confirmed ACM, removed as ACM, in accordance with the procedures contained herein. The discovery of any new material(s) should not delay the progress of the work as contained in this specification. Payment for any additional work will be considered on a case-by-case basis by the Environmental Consultant and Chappaqua CSD. It is the responsibility of the Contractor to determine and negotiate the full cost of any such payment prior to performance of any additional work.

F. ACM shall be properly handled, packaged, and transported for disposal in a landfill in accordance with all Federal, State and Local regulations. After September 4, 2006, the Contractor shall follow Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (Cited as 12 NYCRR Part 56) as amended effective March 21, 2007. All related manifests and shipping logs shall be provided to Chappaqua CSD upon or before the end of the project.

G. All work shall be accomplished in strict adherence to the project Specification, applicable Federal, State, and Local Regulations. Whenever there is a conflict or overlap of the above references, the more stringent provision shall apply.

H. The Contractor's industrial hygiene practices during asbestos abatement will be monitored by Chappaqua CSD’s Environmental Consultant. The Contractor shall be responsible for monitoring his/her own construction safety work practices for compliance with the OSHA regulations.

I. The Asbestos Contractor shall provide the best available technology, and state-of-the-art procedures and methods of execution, clean-up, disposal, and safety.

J. The Contractor will be required, if approved by Chappaqua CSD and/or its Representative, to obtain at his/her own expense appropriate variances from regulatory agencies as required to complete the safe removal of asbestos containing material as described in this specification.

K. Chappaqua CSD’s environmental consultant will sample all suspect materials that may be identified during the course of demolition, if applicable. The Contractor shall provide access to the consultant to perform the testing and no additional costs will be paid for the time it takes to perform the testing. The contractor shall provide itemized cost proposal to Chappaqua CSD which must include separate costs for the abatement of the individual materials revealed to be ACM (if applicable). Additional

asbestos-containing materials shall not be abated without written authorization from Chappaqua CSD or environmental consultant. The contractor will not be compensated for any additional materials that can be encountered during the abatement project, without prior written authorization from Chappaqua SD or environmental consultant.

1.02 PHASING OF WORK:

This work shall include asbestos abatement associated with upcoming additions and alteration projects at Horace Greeley High School. The Asbestos Contractor shall perform and complete the abatement of asbestos-containing materials during regular working hours, Monday through Friday between 8:00 am and 4:00 pm or as directed by the facility. It is the Contractor's responsibility to ensure that acceptable visual inspection and air monitoring results are obtained with fiber count of <70 Structures/mm2 of air using AHERA analysis method and are completed prior to the return of building occupants or other trades. All work shall be coordinated with Chappaqua CSD and Chappaqua CSD’s Environmental Consultant prior to start of any work. The Chappaqua CSD’s Environmental Consultant shall be present whenever any asbestos abatement work is being conducted.

1.03 AUTHORITY TO STOP WORK:

Chappaqua CSD and the Environmental Consultant shall have the authority to stop the abatement work at any time the contractor’s work is not in conformance with the Specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected to the satisfaction of Chappaqua CSD and the Environmental Consultant. Standby time to resolve the problems shall be at the contractor's expense.

1.04 SITE REQUIREMENTS:

A. Noise Control: Provide mufflers or other acceptable means of noise reduction for all equipment to be used by the Contractor. Observe local laws regarding noise control.

B. Wastewater: All water used by the Contractor during asbestos abatement activities shall be collected and passed through a water filtration system capable of filtering particles down to 5 microns prior to being discharged into the sanitary sewer. The Contractor shall contact the Westchester County engineering department to determine the acceptable location(s) to access the sanitary sewer. The Contractor shall be responsible for connection to the sanitary sewer, and for providing piping, pumps, water filtration systems, and other items necessary to collect, transport, filter, and dispose of the wastewater.

C. Log In/Out: The Asbestos Contractor must ensure all workers log in and out daily at the site.

D. The location of the Decontamination Unit shall be a location agreed upon between The Asbestos Contractor, Chappaqua CSD and Chappaqua CSD’s environmental consultant. All variations must be coordinated and approved by the site manager and Chappaqua CSD’s Environmental Consultant.

1.05 HEALTH AND SAFETY:

A. Toxic Effects: The Contractor shall assume all responsibility for any toxic effects to workers from the air supplied to respirators, or from toxic or damaging vapors or residues resulting from the use of encapsulant and/or wetting agents or other substances used by the Contractor during construction.

B. Chemical/Biological Hazards: The known chemical/biological hazards on site include asbestos-containing material and debris. The Contractor shall provide materials, equipment and training to its workers to ensure their protection from these and any other chemical/biological hazards which may be identified during the course of this work.

C. Physical Hazards: The Contractor shall provide safety equipment and training to his/her workers to ensure their protection from any physical hazards including but not limited to trip/fall hazards, working at elevation, heat stress, contact with energized (hot) active equipment, noise, overhead bump hazards, and electrical shock that may be present during the Work.

D. Safety Act: The Occupational and Safety Health Act (OSHA) of 1970, as amended, shall be strictly complied with during the course of this project. This Act shall govern the conduct of the Contractor's workmen, tradesmen, material-men, and subcontractors, and visitors to the project site.

E. Accident Prevention: In order to protect the lives and health of his/her employees, the Contractor shall comply with all pertinent provisions of the latest edition of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc. and shall maintain an accurate record of all accidents which occur during the project. An injury or loss of life must be immediately reported by the Contractor to the Chappaqua CSD and/or its Representatives, and a copy of the Contractor's report to his/her insurer of an accident must be provided to the Chappaqua CSD and/or its Representatives.

F. Emergency Response: The Contractor shall establish an Emergency Response Team made up of members of his/her work force. Team members shall be trained, organized, and capable of responding in the event of an accident, fire, or other emergency. The Contractor shall designate a site Safety Coordinator to train team members regarding the location and use of site-specific fire/life safety equipment. As a minimum requirement, members of the Emergency Response Team shall be knowledgeable in standard first aid and CPR techniques, fire extinguisher use, and evacuation procedures.

G. Workmen Protection: The Contractor shall provide and maintain all safety measures necessary to properly protect workmen.

H. Emergency Actions: In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, to prevent such threatened loss or injury without special instruction or authorization from the Chappaqua CSD and/or its Representatives, is hereby permitted to act at his/her discretion.

I. Hazard Communication Act: The Contractor shall comply with the Hazard Communication Standard promulgated by the Occupational Safety and Health Administration (OSHA No. 29 CFR 1910.1200). This program ensures that all employers provide the information they need to inform and train employees properly and to design and put in place employee protection program. It also provides necessary hazard information to employees so they can participate in, and support, the protective measures needed at their work place. The contractor shall ensure that labels or other forms of warning are legible in English. Employer having employees who speak other languages must add the information in their languages. See OSHA 29 CFR 1910.1200 for more details.

1.06 WORK SUPERVISION AND COORDINATION:

A. Abatement Contractor's Supervisor: From the start of work through to the project completion the Contractor shall have on-site a responsible and competent supervisor who posses valid NYSDOL Supervisor certifications. As a minimum, the Asbestos Contractor's Supervisor shall meet the qualifications as required by Article 1.12, for a job supervisor. The Supervisor shall be on site during all working hours. When the Supervisor must leave site during work, a temporary Supervisor shall be appointed.

B. Quality of Work: The Supervisor shall supervise, inspect and direct the Work competently and efficiently, devoting such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Supervisor shall be responsible to see that Work complies accurately with the Contract Documents, and that all Work installed is of good quality and workmanship.

1.07 SUBMITTALS:

Unless otherwise noted the Contractor shall submit three (3) copies of each APPLICABLE submittal to the Chappaqua CSD’s Environmental Consultant and its Representatives for review and/or approval. The Contractor shall provide the following:

A. Pre-Project Submittal:

1. Certificates of Insurance naming Chappaqua CSD as additional insured.

2. All required bonds. All bonds shall be underwritten by a United States based, preferably New York State, A or B rated bonding company.

3. List of Subcontractors.

4. Health and Safety Plan: Provide a written Health and Safety Plan addressing procedures for work place safety. As a minimum, the following topics shall be addressed in the plan:

a. Hazard Communication. Procedure on how physical and health hazards associated with the work are identified and communicated to employees, and name of the person responsible for implementation of the Hazard Communication Program.

b. Guidelines for assessment and prevention of heat stress.

c. Procedures for using ladders safely.

d. Electrical safety procedures.

e. Emergency Action Plan: The Contractor shall submit for review a written Emergency Action Plan. This Plan shall outline the contingency actions to be performed for emergencies including fire, accident, power failure, supplied air system failure, breach of work area containment, unexpected asbestos contamination in the site area and on the adjoining grounds, or spilling of asbestos material being hauled to storage and/or disposal. This Plan shall identify the manner in which emergencies are announced, emergency escape procedures and routes, and procedures to account for all employees after evacuation. The Plan shall identify those persons responsible for fire/life safety duties including the Site Safety Coordinator, persons responsible for fire prevention equipment and the control of fuel source hazards, and the members of the Emergency Response Team (see Paragraph "Emergency Response" of this Section). This Plan shall be readily available for review by all workers.

f. Fall Protection Plan: The Contractor shall submit for review a written Fall Protection Plan. This plan shall outline the actions to be performed to protect personnel when they are working at elevation. The plan shall detail specific fall protection devices to be utilized, training provided to personnel for same and training of designated competent person in charge of and responsible for the elevated work site.

5. Proof of written notifications required by Paragraph "Codes, Permits and Standards" of this Section. Proof that all required permits and variances have been obtained. NYSDOL and EPA project notifications paid in full.

6. Proof of written notification to the local police department, fire department and Facility (include a copy of required by NYS DOL 12 NYCRR PART 56 section 563.6a ten day notice) that asbestos abatement work is being conducted. As a minimum, the notification letter shall include the address of the Facility, dates work is to be performed, and drawings indicating the areas to undergo abatement.

7. Documentation of compliance with all requirements of paragraph "Requirements and Qualifications" of this Section. Submittal shall include:

   a. Proof that the job supervisors, foremen, and asbestos abatement workers meet State certification and license requirements.

   b. Proof of a current medical surveillance program for all Contractor's personnel to work on this project.

c. Completed and notarized Certificate of Worker's Release for each asbestos abatement worker, workers of other trades, or supervisory personnel who enter the work area or otherwise contact ACM.

8. Proof of a respiratory protection program. Submit level of respiratory protection intended for each operation required by the project.

9. Proof of historic airborne fiber data. Submit airborne asbestos fiber monitoring data from an independent air monitoring firm to substantiate selection of respiratory protection proposed. Data shall include the following for each procedure required by the work: 1. date of measurement; 2. type of work task monitored; 3. methods used for sample collection and analysis, and; 4. number, duration and results of samples taken.

10. Proof that a landfill site has been located, and arrangements for transport and disposal of asbestos-containing or asbestos-contaminated materials have been made. Provide the name and location of the landfill, and waste transport company, if applicable.

11. Manufacturer's literature on all proposed job related equipment and products to be used on this project. Include Safety Data Sheets (SDS) for encapsulant, fire retardant plastics, mastic remover and other chemicals to be used on this project.

12. A detailed Asbestos Removal and Disposal Work Plan which describes all aspects of the work to be performed for this project. The Plan shall include the following:

a. A detailed description of the work area enclosure. Provide shop drawings (with dimensions and locations) of proposed decontamination facilities and work areas. These drawings shall indicate the following: 1) areas to be sealed off and work area boundaries; and 2) proposed layout and location of the decontamination enclosure systems. Include a detailed description of any modifications or changes to be made to the specified negative pressure work area enclosure.

b. Specimen of the daily log proposed for use. Minimally, the log should include the date(s) and time(s) when all personnel enter and leave the work area(s).

B. During Work Submittal:

1. Schedule of Work Changes: Any changes in the Schedule of Work proposed by the Contractor shall be submitted for approval to Chappaqua CSD no later than seven days prior to the commencement date of the proposed change. A revised Schedule shall be submitted at the end of each week.

2. Notarized copy of payroll showing that prevailing wage rates have been paid shall be submitted to the Chappaqua CSD on a weekly basis. Contractor shall use DOL form for wage payment.

3. A "Request For Services" form shall be submitted at least 24 hours in advance of required air monitoring tests and inspections to be performed by the Chappaqua CSD's Environmental Consultant.

4. Results of all air monitoring performed by the Contractor shall be posted within 24 hours for regular abatement project after collection for all workers to see. A copy of the results shall be given to the Chappaqua CSD's Environmental Consultant at the same time.

5. A certified, signed, and completed copy of each "Waste Shipment Record" form used, and receipts from the landfill operator which acknowledge the Contractor's delivery(s) of material, shall be submitted to the Consultant and Engineer within thirty days following removal of ACM from building.

6. A copy of the bound log book.

C. Post Project Submittal:

1. A notarized "Release of Liens" in a form acceptable to the Chappaqua CSD. Use the standard AIA form. Such notarized release of all liens shall certify that all subcontractors, labor suppliers, etc., have been paid their pro rate share of all payments to date, that the contractor has no basis for further claim, and will not make further claim for payment in any account after the first payment is made to him.

2. Proof of payment of prevailing wage rate to direct employees and subcontractor.

3. Notarized copies of a daily log showing the date(s) and time(s) of entrance to and exit from the work area(s) for all persons.

4. Compilation in chronological order of all air monitoring records pertaining to this project.

5. Compilation of all completed and signed Waste Shipment Record forms, bills of lading, or disposal receipts pertaining to this project.

6. Copies of notifications and checks to applicable agencies (see Subparagraph "Pre-Project Submittal Information" of this Section) that the asbestos abatement project has been completed.

7. Contractor shall submit the following items as part of his final submittals: Paid invoice verifications for sub-contractor (for Time and Material job), service contract agreement, insurance certificates, copies of the workers licenses (NYSDOL), and other submittal required for the Specification.

1.08 FIRE PROTECTION AND EMERGENCY EGRESS:

The Contractor shall be responsible to the security and safeguarding of all areas turned over by the facility to the Contractor. The Contractor shall designate to his/her workers and other building occupants a means of egress in case of emergency.

A. The Contractor shall establish emergency and fire exits from the work area. First aid kit, 2 full sets of protective clothing and respirators shall be provided for use by qualified emergency personnel in the clean room of the decontamination facility.

B. For full containment only, the Contractor shall provide a secure work area to protect against unauthorized entry into and around the work area. Any hazardous conditions shall be reported to the contractor's Supervisor and the contractor shall correct the hazard immediately. Any intrusion or incident shall be documented in a bound log book which shall be maintained at the project site.

1.09 CLEAN-UP:

A. Asbestos Related Clean-up: All clean-up work related to asbestos abatement work shall be in strict accordance with general technical requirements and this specification.

B. Final Site Cleaning: Upon completion of the work, the Contractor shall remove all temporary construction, decontamination facilities, and unused materials placed on site by the Contractor; put the premises in a neat and clean condition; and provide all sweeping, cleaning, and washing required to restore the site to its original condition.

1.10 CODES, PERMITS, AND STANDARDS:

A. The Contractor shall be solely responsible for compliance with all applicable federal, state (12 NYCRR Part 56 Adopted March 21, 2007), and local laws, ordinances, codes, rules, and regulations which govern asbestos abatement work or hauling and disposal of asbestos waste material. The current issue of each document shall govern. All work shall comply with all applicable codes and regulations as amended.

B. Before starting the work, the Contractor shall examine the Technical Specification for compliance with codes and regulations applicable to the work and shall immediately report any discrepancy to the Chappaqua CSD's Environmental Consultant.

C. Where conflict among requirements or with these Specifications exists, the more stringent requirements shall apply.

D. Permits, State Licenses, and Notifications: The Contractor shall be responsible for obtaining necessary permits, variances, state licenses, and certifications of personnel in conjunction with asbestos removal, hauling, and disposition and shall provide timely notification of such actions as may be required by federal, state,

regional, and local authorities. Fees and/or charges for these licenses, permits, and notifications shall be paid by the Contractor. Contractor shall use all notification forms where applicable.

1. Agency Notification: At least 10 days prior to commencement of any asbestos removal, the Contractor shall prepare written notification to EPA Region 2, to the New York State Department of Labor (NYSDOL), and all other applicable agencies having jurisdiction. In addition, the Contractor shall be required to obtain any other permits for work covered under this specification including permits required for air sampling.

1.11 TERMINOLOGY:

The following commonly-used terms are defined in the context of these Specifications:

A. Asbestos Project: Work that involves the removal, encapsulation, enclosure, repair or disturbance of friable or non-friable asbestos, or any handling of asbestos material that may result in the release of asbestos fibers. For the purpose of compliance with this Part, an asbestos project shall include any disturbance of asbestos fibers, and the planning, asbestos survey (as per Subpart 56-5.1), design, background air sampling, inspection, air sampling and oversight of abatement work, cleanup, and the handling of all asbestos material subject to abatement, as well as the supervising of such activities. Installation of friable ACM shall also be considered an asbestos project. An asbestos project starts with Phase I when the planning, asbestos survey, and design work begins or is required to begin. The project shall not be considered completed until Phase II D is complete.

B. Asbestos-Containing Material (ACM): Any material or product which contains more than 1 percent asbestos.

C. Aggressive Air Sampling: Air monitoring samples collected while a leaf blower, fans, or other such devices are used to generate air turbulence within the work area.

D. Air Filtration Device (AFD) - A portable local exhaust system equipped with HEPA filtration, capable of maintaining a constant low velocity air flow into contaminated areas from adjacent, uncontaminated areas and capable of maintaining a negative air pressure with respect to the adjacent, uncontaminated areas.

E. Air Lock: A system for permitting ingress or egress to the work area while permitting minimal air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways placed a minimum of three feet apart.

F. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time. Personal air sampling results shall be calculated to reflect the employee's eight-hour time weighted average (TWA) exposure. Area sampling results are reported directly, without calculating the TWA.

G. Amended Water: Water to which a surfactant has been added.

H. Asbestos Removal Encapsulant: A chemical solution used in place of amended water during asbestos removal to penetrate, bind, and encapsulate the asbestos-containing material.

I. Authorized Visitor: Chappaqua CSD's Environmental Consultant or representatives of any regulatory or other agency having jurisdiction over the project.

J. Chappaqua CSD's Environmental Consultant: Chappaqua CSD's agent who is authorized to exercise general contract administration and industrial hygiene inspection of the work.

K. Certified Industrial Hygienist (CIH): One certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.

L. Class II asbestos work: Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Class I asbestos work includes the removal of thermal system or surfacing materials.

M. Competent Person: Definition and responsibilities as set down in 29 CFR 1926.1101(b) and as outlined herein.

N. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

O. Decontamination Enclosure System: A series of connected rooms for the decontamination of workers (a Personnel Decontamination Enclosure System) or of materials and equipment (Equipment Decontamination Enclosure System).

P. Equipment Decontamination Enclosure System: A decontamination system for waste materials and equipment, typically consisting of a designated area of the work area, a washroom, and a holding area, with an air lock between any two adjacent rooms and a curtained doorway between the holding area and the non-work area. Not to be used for personnel entry/exit.

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

R. Encapsulation: Application of an encapsulant to asbestos-containing building materials to control the possible release of asbestos fibers into the ambient air.

S. Enclosure: Procedures necessary to completely enclose ACM behind air-tight, impermeable, permanent barriers.

T. Excursion Limit (EL): The EL is an airborne concentration of asbestos to which no employee shall be exposed when not using respiratory protection. The EL is 1.0 f/cc as averaged over a 30 minute period.

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

V. Friable: Any material which, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, or is capable of being released into the air by hand pressure.

W. Full Facepiece High Efficiency Respirator (FFHER): A respirator which covers the wearer's entire face from the hairline to below the chin and which is equipped with a HEPA filter.

X. Half Mask High Efficiency Respirator (HMHER): A respirator which covers one-half of the wearer's face, from the bridge of the nose to below the chin, and is equipped with HEPA filters.

Y. HEPA Filter: A high efficiency particulate air (HEPA) filter capable of trapping and retaining 99.97 percent of the fibers of 0.3 micrometer or larger in diameter.

Z. HEPA Vacuum Equipment: High efficiency particulate air (HEPA) filtered vacuuming equipment having a UL 586 filter system capable of collecting and retaining asbestos fibers.

AA. Large Asbestos Project: Large asbestos project shall mean an asbestos project involving the disturbance, enclosure, encapsulation, repair or handling of 160 square feet or more of ACM, PACM or asbestos material or 260 linear feet or more of ACM, PACM or asbestos material.

AB. Lockdown: Procedure of applying an encapsulant as a protective coating or sealant to a surface from which ACM has been removed in order to control and minimize airborne asbestos fiber generation that might result from residual asbestos-containing debris.

AC. Minor Asbestos Project: Minor project shall mean an asbestos project involving the disturbance, enclosure, encapsulation, repair or handling of 10 square feet or less of ACM, PACM or asbestos material or 25 linear feet or less of ACM, PACM or asbestos material.

AD. Movable Object: A unit of equipment or furniture which can be removed from the work area.

AE. Plasticize: To cover floors and walls with plastic sheeting as herein specified.

AF. Permissible Exposure Limit (PEL): The PEL is an airborne concentration of ACM to which no employee shall be exposed when not using respiratory protection. The OSHA PEL is 0.1 f/cc expressed on an 8-hour time weighted average (TWA).

AG. Personnel Decontamination Enclosure System: A decontamination system for personnel and limited equipment, typically consisting of an equipment room, shower room, and clean room, with an air lock between any two adjacent rooms, and a curtained doorway between the equipment room and the work area, and a curtained doorway between the clean room and the non-work area. The decontamination system serves as the only entrance/exit for the work area.

AH. Powered Air Purifying Respirator (PAPR): Either a full face-piece, helmet, or hooded respirator that powers breathing air to the wearer after the air has been purified through a HEPA filter.

AI. Regulated Abatement Work Area: The portion of the restricted area where abatement work actually occurs. For tent work areas, the interior of each tent is a regulated abatement work area. For OSHA Class I and Class II asbestos abatement, the interior of the restricted area containment enclosure is the regulated abatement work area. For exterior non-friable asbestos abatement conducted without the establishment of negative air ventilation systems or containment enclosures, the entire restricted area surrounding the abatement location is considered to be the regulated abatement work area.

AJ. Removal: The act of removing and transporting asbestos-containing or asbestos-contaminated materials from the work area to a suitable disposal site.

AK. Small Asbestos Project: Small asbestos project shall mean an asbestos project involving the removal, disturbance, repair, encapsulation enclosure or handling of more than 10 and less than 160 square feet of ACM, PACM or asbestos material or more than 25 and less than 260 linear feet of ACM, PACM or asbestos material.

AL. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

AM Tent Procedure: A fire retardant polyethylene enclosure that includes walls, ceiling and a floor as required to remove ACM, PACM or asbestos material.

AN. Type C Respirator: A respirator which supplies air to the wearer from a source outside the work area by means of a compressor.

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

AP. Work Area: Designated rooms, spaces, or areas of the project where asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area has been sealed, plasticized, and equipped with an airlock entrance or a decontamination enclosure system. A non-contained work area is an isolated or controlled-access area which has not been plasticized.

1.12 REQUIREMENTS AND QUALIFICATIONS:

A. Minimum Experience: The Contractor shall have experience with abatement work, as evidenced through participation in at least ***five*** asbestos abatement projects of complexity comparable to this project.

B. Experience and Training: The Contractor's job supervisors, foremen, and workers shall be adequately trained and knowledgeable in the field of asbestos abatement. All personnel engaged in asbestos abatement or related activities shall have New York State DOL certifications. All phases of the work shall be executed by skilled craftsmen experienced in each respective trade. Proof of such experience shall be submitted upon request by the Chappaqua CSD. Improperly trained, untrained, or inexperienced personnel shall not be allowed in the work area(s). Personnel shall meet minimum training and experience requirements outlined in this Section.

1. The Contractor's on-site job supervisor shall have successfully completed, within the last twelve months, the NYSDOH-approved course "Supervision of Asbestos Abatement Projects", and shall be qualified as a NYSDOL-certified Contractor/Supervisor. Course must be provided by an NYSDOH-approved training provider. The supervisor shall have experience with abatement work, as evidenced through participation in at least two asbestos abatement projects of complexity comparable to this project.

2. The job supervisors and foremen shall be thoroughly familiar with and experienced in asbestos removal and related work and shall meet the requirements of a competent person set down in OSHA Standard 29 CFR 1926.1101.

3. All asbestos abatement workers shall be knowledgeable, qualified, and trained in the removal, handling, and disposal of asbestos material and in subsequent cleaning of the affected environment. All asbestos abatement workers shall be certified as having attended and satisfactorily completed asbestos worker training in accordance with OSHA Standard 29 CFR 1926.1101(k)(3). Course must be provided by an NYSDOH-approved training provider.

4. The Contractor's job supervisors, foremen, and asbestos abatement workers shall be certified and licensed as required by the NYSDOL.

5. Prior to commencement of work, all personnel who are to enter the work area shall be instructed in and shall be knowledgeable of the appropriate procedures for personnel protection and asbestos abatement. On-site training in the use of equipment and facilities unique to this job site shall be performed. Emergency evacuation procedures from the work area shall also be included in worker training.

C. Supervision Requirements: The Contractor shall provide adequate job supervision for all phases of the asbestos abatement work.

1. The Contractor shall have a NYSDOL job supervisor present on site whenever work described in this Section is in progress. If the job supervisor leaves the site for any reason a qualified and certified supervisor, who meets the requirements of this Section and is familiar with the current status of the work, shall be designated. Chappaqua CSD's Designated Representative shall be informed of the substitution. The supervisor must be familiar and experienced with asbestos removal and its related work, safety procedures, and equipment.

D. Worker Medical Examinations: The Contractor shall provide medical examinations for all employees engaged in asbestos removal and disposal operations, in accordance with OSHA Standards 29 CFR 1910.134(b), 1926.1101, and applicable state regulations. The Contractor shall ensure that all employee examination results are on file in his office and available for review and are maintained in accordance with OSHA Standard 29 CFR 1926.1101 (n) (3).

E. Certificate of Worker's Release: Each asbestos abatement worker, workers of other trades, or any supervisory personnel who enter the work area, or otherwise contact ACM, shall submit a Certificate of Worker's Release, as required in the Section "Submittal".

1.13 TESTING AND INSPECTION REQUIREMENTS AND RESPONSIBILITIES:

Visual inspections and air monitoring will be performed before, during, and after asbestos abatement to document airborne asbestos fiber concentrations as defined in this specification.

A. Chappaqua CSD's Responsibilities:

1. Chappaqua CSD will employ an Environmental Consultant to perform Project Monitoring and air testing. The project monitor will have the authority to approve the contractor's work, stop the contractor's work and direct the contractor to take corrective actions where required.

2. Area air samples will be collected and analyzed using NIOSH Method 7400. Air samples will be collected during each shift as required by the regulations.

3. Clearance testing by Transmission electron microscopy (TEM) will be conducted as per AHERA regulations. Air samples will be collected to demonstrate final re-occupancy clearance for work areas within the building. The fiber concentration must comply with the specified clearance level as per AHERA and this specification. Chappaqua CSD will provide for collection and analysis of one round of samples required to demonstrate clearance in each discrete work area.

4. Chappaqua CSD's Environmental Consultant will perform inspections of the work area, as specified, upon request of the Contractor.

B. Contractor's Responsibilities:

1. TEM air samples which fail to meet the re-occupancy clearance standard

shall be paid for by the Contractor. Should a delay occur, due to failure(s) of clearance air testing, all associated expenses such as TEM analysis, and the Environmental Consultant's time for additional cleaning and air testing, shall be paid by the asbestos contractor. If results of the inside work area group of air samples are unsatisfactory, recleaning of regulated abatement work area surfaces using wet methods, followed by another drying time period and then collection and analysis of an additional set (both inside and outside work area samples) of clearance air samples is required. If only the results of the outside work area group of air samples is unsatisfactory, cleanup of surfaces outside of the regulated abatement work area using HEPA-vacuums and wet-cleaning methods shall be performed prior to collection and analysis of an additional group of outside work area clearance air samples as required by 12 NYCRR PART 56 Section 56-9.2. This recleaning/clean-up and sampling process shall be repeated until satisfactory clearance air sampling results have been achieved for all asbestos project non-exempt regulated abatement work areas throughout the entire work site.

2. The Contractor, at his/her expense, shall provide OSHA monitoring and all other all tests required by specified applicable regulations, codes, and standards and any other tests for his/her use. The use of a testing laboratory by Chappaqua CSD does not release the Contractor from providing tests required for the protection and safety of his/her employees.

3. The Contractor shall employ an independent testing laboratory for analysis of OSHA personal air monitoring samples. The laboratory used for air sample analysis shall be successfully participating in the "Proficiency Analytical Testing (PAT) Program for Laboratory Quality Control for Asbestos." The monitoring shall be supervised by an Industrial Hygienist certified by the American Board of Industrial Hygiene (A.B.I.H.). Each testing laboratory shall be ELAP (Environmental Laboratory Accreditation Program) and NVLAP (National Voluntary Laboratory Accreditation Program) certified. Chappaqua CSD shall approve the contractor's testing laboratory.

4. From each work area the Contractor, at his/her expense, shall collect and analyze OSHA personal air monitoring samples. Sampling shall be repeated during each different work activity. Sample collection and analysis shall be performed using the OSHA Reference Method as outlined in 29 CFR 1926.1101, Appendix A.

5. Results of all air monitoring performed by the Contractor shall be posted within 24 hours for regular abatement project after collection for all workers to see. A copy of the results shall be given to the Chappaqua CSD's Environmental Consultant at the same time.

6. The Contractor shall be advised whenever questions arise concerning compliance with standards of quality and completeness of the work, and shall use his/her best efforts to resolve any such questions to the satisfaction of the Chappaqua CSD's Environmental Consultant.

7. Where air monitoring tests and/or inspections are specified, the Contractor shall notify Chappaqua CSD's Environmental Consultant, in writing, 24 hours, in advance of the required test and/or inspection.

8. The Contractor is responsible for ensuring the Work is complete to the level that meets the criteria of the inspection. The Contractor shall perform an inspection of the Work to evaluate completeness prior to requesting an inspection by the Chappaqua CSD's Environmental Consultant.

C. Time Requirements for Chappaqua CSD's Environmental Consultant's Inspections and Testing: Where visual inspections or air testing is required to be performed by the Chappaqua CSD's Environmental Consultant, the Contractor shall allow for the following response/analytical time for completion of the inspection/test.

1. Where visual inspections are required, allow 24 hours, beginning from the time the Contractor's request is received by the Chappaqua CSD's Environmental Consultant, for the performance of the inspection.

2. Where TEM clearance air monitoring tests are required, allow 24 hours, beginning from the time the Contractor's written request is received by the Chappaqua CSD's Environmental Consultant, to the beginning of the air test.

PART 2 - PRODUCTS

2.01 MATERIALS:

Materials provided under this section shall be standard products of manufacturers regularly engaged in the production of the items and shall conform to OSHA Standard 29 CFR 1926.1101; EPA Standard 40 CFR 61, Subpart M; Department of Transportation Standards 49 CFR 171, 172, and 173; applicable state regulations; and requirements specified herein. Materials listed under this section "or equal" shall be provided for work under contract.

A. Plastic: Provide fire retardant plastic of 6-mil thickness shall be provided in rolls of sizes which will minimize the frequency of joints. Fire retardant plastic sheet shall be used for plasticizing the enclosed work area, for preparation of the decontamination enclosure system, and for waste packaging.

B. Reinforced Fire Retardant Plastic: Provide reinforced polyethylene sheet for the floor area of the decontamination enclosure system. Reinforced plastic sheet provided for this project shall be a 19 mil, 3-ply, high density flame resistant-reinforced-polyethylene sheet. Plastic color shall be opaque.

C. Duct Tape: Duct tape shall be capable of sealing joints of adjacent sheets of plastic and of attaching plastic sheeting to finished surfaces without damage to existing finish and shall be capable of adhering under both dry and wet conditions, including use of amended water

D. Surfactant: Surfactant (Wetting Agent) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

E. Lockdown Encapsulants: Encapsulants used after asbestos removal to lockdown fugitive fibers shall carry a Class "A" fire resistance rating and shall have an ASTM E-162 flame spread index of 15 or less. A tint shall be given to the encapsulant by means of the addition of non-toxic, nonflammable colorings before application. The encapsulant shall be installed according to the manufacturer's written instructions.

F. Caulking Sealant: Caulking sealant shall be single component, non-sag elastomer with 1600% elongation capacity. Sealant shall meet the requirements of Federal Specification TT-S-00230C, Class A Type II. Sealant shall be used to form an airtight seal around plywood barriers or temporary partitions, to seal along the seams of the decontamination enclosure system's plywood sheathing, and to seal around piping or other small penetrations of the work area. Sealant application shall be according to the manufactures written instructions.

G. Foam Sealant: Foam Sealant shall be expanding urethane Class 1 foam sealant with an Underwriters Laboratories, Inc. (U.L. 723) flame spread index of 25 or less, smoke developed index of 0, and a minimum operating temperature range between -30ºF and 250ºF.

H. Plywood: Plywood used for temporary partitions, decontamination enclosure systems, and tunnels shall be an exterior grade and a minimum 3/8-inch thick.

I. Spray Adhesive: Spray Aerosol Adhesive shall be specially formulated to stick to sheet polyethylene (3M 76, 3M 77, or equivalent).

J. Other Materials: All other materials, such as lumber, plywood, tools, scrapers, brushes, cleaning materials, adhesive, nails, hardware, etc., which are required to perform the work described in this Section shall be provided. Materials and equipment shall be new or used, uncontaminated by asbestos, in serviceable condition, and appropriate for the intended purpose.

K. Disposal Bags: Plastic Disposal Bags shall be a minimum of six mils in thickness. Bags shall be labeled in accordance with this Section.

L. Shipping Containers: Impermeable Containers shall be suitable to receive and retain any asbestos-containing or asbestos-contaminated materials until they are disposed of at an approved landfill. The containers shall be labeled in accordance with this Section. Containers shall be both airtight and watertight and conform to DOT Standard 49 CFR 178.224. Each container shall be constructed of fiber, hard plastic, or metal, with locking, airtight lids.

M. Markings and Labels: Disposal bags and shipping containers shall bear danger labels, transportation packaging labels, and generator identification information. Labels shall be permanently affixed to all bags and shipping containers containing ACM, in accordance with OSHA Standard 29 CFR 1926.1101(k)(2), DOT Standard 49 CFR Part 171 and 172, and EPA Standard 40 CFR Part 61.150(a)(1)(v).

1. Danger label format and color shall conform to OSHA Standard 29 CFR 1926.200. Danger labels shall display the following legend/information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG
DISEASE HAZARD

2. DOT Marking and Labels: Markings and labels shall be permanently affixed to all bags and containers containing ACM, in accordance with DOT 49 CFR 172.304 and 172.407.

   a. Markings shall display the following text:

      RQ, ASBESTOS, NA 2212

   b. Labels shall be diamond shape and shall be located near the Marking text. Labels will consist of a diamond a minimum of 100 millimeters (mm) on each side with each side having a solid line inner boarder 5.0 to 6.3 mm from the edge. The label shall be white with seven black vertical stripes on the top half. Black stripes and white spaces shall be equally spaced. The lower half of the label shall be white with the class number "9" underlined and centered at the bottom. Refer to DOT 40 172.446 for label format.

3. Generator identification information shall be affixed to each DOT label format and color shall conform to DOT Standard 49 CFR 172.304. Generator identification information labels shall display the following legend/information:

   GENERATOR'S NAME
   GENERATOR'S 24 HOUR PHONE
   GENERATOR'S FACILITY ADDRESS

N. Reuse of Containers: If impermeable containers used to transport bagged asbestos waste to the landfill are to be reused, the empty containers shall display the following label:

RESIDUE:
LAST CONTAINED ASBESTOS RQ

O. Warning Signs: Warning Signs shall be posted at the perimeter of the work area prior to abatement operations in accordance with OSHA Standard 29 CFR 1926.1101. Danger sign format and color shall conform to OSHA Standard 29 CFR 1926.200. The signs shall display the legend indicated below:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS AREA

P. Mastic remover. The contractor shall use an odorless mastic remover. Manufacture and brand of mastic remover shall be approved by the Facility prior to commencing removal work.

2.02 EQUIPMENT:

Equipment provided under this section shall conform to applicable federal and state regulations, local codes, and the requirements specified herein.

A. Spraying Equipment: Equipment used to apply amended water or removal encapsulant shall be of a low pressure type to prevent disturbance of the asbestos prior to physical controlled removal. Airless spray equipment shall be provided for the application of asbestos encapsulant.

B. Vehicles: Trucks or Vans used for the transportation of asbestos waste shall be enclosed and suitable for loading, temporary storage, transit, and unloading of asbestos-contaminated waste without exposure to persons or property.

C. Fall Protection Equipment: Certified and approved equipment to be used by trained personnel when working at elevation to protect against falling from an elevated work area.

D. Fire Extinguisher: Type "ABC" dry chemical extinguisher or a combination of several extinguisher of NFPA recommended types for the fire hazard exposures in each extinguisher location shall be provided. Minimum size of extinguisher shall be 4-A, and 40-B:C. Supply a minimum of one extinguisher for every 1,000 square feet of floor area, with a maximum travel distance to an extinguisher of 75-feet. Supply at least one extinguisher in each decontamination enclosure equipment room, and clean room. Supply 2 additional extinguishers inside the work area

E. Smoke Detectors: Smoke detectors of the battery powered ionization type will be required at a rate of one per 5,000 square feet, with a minimum of one smoke detector in the decontamination enclosure clean room, and one in the work area.

F. Water Filtration System: A system capable of filtering and retaining particles larger than 5.0 microns in size shall be provided.

G. Carts: Provide water tight wheeled carts with tight fitting lids suitable for movement of non-contaminated waste or bagged asbestos waste from the decontamination enclosure system to the waste storage container or transport vehicle.

H. Power Tools: Provide power tools necessary to complete the Work. Power tools used directly for asbestos removal shall be equipped with a dust collection system. Attach a shroud connected to a HEPA vacuum system for capture of dust.

2.03 WORKER PROTECTIVE CLOTHING AND EQUIPMENT:

Protective clothing and equipment shall conform to OSHA Standard 29 CFR 1926.1101

A. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Disposable coveralls, head covers, and 18-inch high boot-type foot covers shall be constructed of material equal to DuPont "TYVEK-Type 14" or Kimberly-Clark "Kleenguard", as a minimum requirement.

1. The Contractor shall provide authorized visitors and the Chappaqua CSD's Environmental Consultant suitable properly fitting protective disposable clothing, headgear, hard hats, eye protection, respiratory protection, and footwear (up to four sets per 8-hour shift) whenever they are required to enter the work area.

B. Equipment: Eye protection and hard hats required for job conditions or by applicable safety regulations shall be provided.

C. Respiratory Protection: The Contractor shall be solely responsible for providing adequate respiratory protection at all times for all individuals in the work area. Types of respirators used shall be approved by MSHA/NIOSH for asbestos in accordance with OSHA Standard 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor shall provide a level of respiratory protection which supplies an airborne fiber level inside the respirator below 0.01 fibers per cubic centimeter (f/cc), as the minimum level of protection allowed. Determine the proper level of protection by dividing the actual airborne fiber count in the work area by the "protection factors" given below for each respirator type:

Respirator Type	Protection Factor
Air purifying: Negative-pressure respirator, High efficiency HEPA filter, Half-facepiece	10
Air purifying: Negative-pressure respirator, High efficiency HEPA filter, Full-Facepiece	50 (quantitative)
Powered air purifying (PAPR): Positive pressure respirator High efficiency HEPA filter, Full-facepiece	1000

Respirator Type	Protection Factor
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Pressure-demand, Full-facepiece equipped with an auxiliary SCBA	1000

1. The Contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.

2. During the use of supplied air systems the Contractor shall provide authorized visitors, Chappaqua CSD's Environmental Consultant, and the testing laboratory representative with individually issued and marked respiratory equipment (up to six units). Respiratory equipment shall be compatible with the supplied air system in use, and shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.

3. Where respirators with disposable filter parts are employed, the Contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.

4. Breathing air supply systems shall conform to the USEPA NIOSH Document EPA-560-OPTS-86-001 (September 1986) entitled "A Guide to Respiratory Protection for the Asbestos Abatement Industry."

5. The Contractor shall have a minimum of two spare air hoses with connectors to permit the Chappaqua CSD's Environmental Consultant or testing laboratory's representative to connect his/her assigned Type C respirator to the air system at any time without having to wait for personnel to exit the work area in order to obtain a spare hose.

3.01 DECONTAMINATION ENCLOSURE SYSTEMS:

A. Personal decontamination system enclosures shall be constructed and functional prior to commencing the regulated abatement work area preparation activities. Waste decontamination system enclosures shall be constructed and functional at the completion of preparation activities. After installation of the personal decontamination system enclosure, all access to the regulated abatement work area shall be via the installed personal decontamination system enclosure.

B. Personal Decontamination System Enclosure - Large Project.

(1) Enclosure – General. A personal decontamination system enclosure shall be provided outside the regulated abatement work area and in close proximity to all locations where personnel shall enter or exit the regulated abatement work area. One personal decontamination enclosure system for each regulated abatement work area shall be required. This system may utilize adequate existing lighting sources separate from the decontamination system enclosure, or shall be supplied with a GFCI protected temporary lighting system. The personal decontamination system enclosure shall be sized to accommodate the number of workers and equipment required for the intended purpose. Such system may consist of existing attached rooms outside of the regulated abatement work area, if the layout is appropriate, that can be plasticized and are accessible from the regulated abatement work area. When this situation does not exist, personal decontamination enclosure systems may be constructed of metal, wood or plastic supports covered with fire-retardant plastic sheeting. A minimum of one (1) layer of six (6) mil fire-retardant plastic sheeting shall be installed on the ceiling, and walls of the enclosure system. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of this area. This system must be kept clean, sanitary and climate controlled at all times in conformance with all federal, state and local government requirements. This system shall remain on-site, operational and be used until completion of Phase II C of the asbestos project.

(2) Rooms and Configuration. The personal decontamination system enclosure shall consist of a clean room, a shower room and an equipment room connected in series but separated from each other by airlocks. There shall be a curtained doorway separation between the equipment room and the regulated abatement work area, and there shall be a lockable door to the outside. (See Figure 1 within 12 NYCRR PART 56) Minimum dimensions for each airlock, shower room and equipment room shall be three (3) feet wide by six (6) feet in height, to allow for adequate access to and from the regulated abatement work area.

(3) Curtained Doorway. An assembly which consists of at least three (3) overlapping sheets of six (6) mil fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the

top and left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

(4) Framing. Enclosures systems accessible to the public shall be fully framed, hard-wall sheathed and utilize a lockable door for safety and security.

(5) Sheathing. A plywood or oriented strand board (OSB) sheathing material of at least 3/8-inch thickness.

(6) Plastic Sheeting. Enclosure systems constructed at the work site shall use at least one (1) layer of six (6) mil fire-retardant plastic sheeting on walls and ceiling. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for floor protection of this area.

(7) Prefabricated or Trailer Units. A completely watertight fiberglass or marine painted prefabricated unit does not require plasticizing. Rooms shall be configured as per paragraph (2) of this Section. All prefabricated or trailer decontamination units shall be kept in good condition, and shall be completely decontaminated after final cleaning and immediately prior to clearance air sampling. Upon receiving satisfactory clearance air results, the prefabricated units shall be sealed then separated from the regulated abatement work area and removed from the site.

(8) Clean Room. The clean room shall be sized to accommodate a full workshift of asbestos abatement contractor personnel, as well as the air sampling technician and the project monitor. The clean room shall be a minimum of six (6) feet in height. A minimum of thirty-two (32) square feet of floor space shall be provided for every six (6) full shift abatement workers, calculated on the basis of the largest work shift. If the largest work shift consists of three (3) or less full shift abatement workers, the minimum clean room size requirement is reduced to twenty-four (24) square feet of floor space. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the regulated abatement work area or enclosure and shall be used to secure the regulated abatement work area and decontamination enclosure during non-work hours.

(9) Shower Room. The shower room shall contain one (1) shower per every six (6) full shift abatement workers, calculated on the basis of the largest work shift. Multiple showers shall be simultaneously accessible (installed in parallel) to certified personnel. Each showerhead shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered

through a system with at least 5.0-micron particle size collection capability. Submersible pumps shall be installed, maintained and utilized in accordance with pertinent OSHA regulations and manufacturer's recommendations. A multi-stage filtering system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtering system by larger particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos-contaminated waste.

(10) Equipment Room. The equipment room shall be used for the storage of decontaminated equipment and tools. A one (1) day supply of replacement filters for HEPA-vacuums and negative pressure ventilation equipment in sealed containers, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A container lined with a labeled, at least six (6) mil plastic bag for collection of clothing shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

(11) Airlocks. Airlock construction shall consist of two (2) curtained doorways with three (3) alternating six (6) mil fire retardant polyethylene curtains per doorway, separated by a distance of at least three (3) feet, such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the next doorway. Minimum airlock size shall be three (3) feet wide, by three (3) feet long, by six (6) feet in height.

C. Personal Decontamination System Enclosure - Small Project

(1) Enclosure Requirements. A personal decontamination system enclosure for a Small asbestos project shall consist of, at a minimum, an equipment room, a shower room and a clean room separated from each other and from the regulated abatement work area and other areas by curtained doorways as defined in 12 NYCRR PART 56 Section 56-2.1. All other provisions for personal decontamination system for a Large asbestos project shall apply. Equipment storage, personal gross decontamination and removal of clothing shall occur in the equipment room just prior to entering the shower. (See Figure 4 in the 12 NYCRR PART 56) The full personal decontamination system enclosure specified for Large asbestos projects is recommended.

D. Remote Personal Decontamination System Enclosure. If a personal decontamination system cannot be attached to the regulated abatement work area, due to available space restrictions or other building and fire code restrictions, a remote personal decontamination system enclosure may be used for limited Special Projects as per subpart 56-11, negative pressure tent enclosure work areas with glovebag only abatement, or if non-friable ACM is being removed in a manner which will not render the ACM friable.

Limitation. If it is found during removal, that the non-friable ACM or asbestos material will become friable during the removal process, and it is logistically possible

to attach the decontamination system enclosure, abatement work must stop immediately while the remote personal decontamination system is relocated to be attached and contiguous to the regulated abatement work area.

The following requirements apply for all remote personal decontamination systems:

(1) Protective Clothing. Workers shall don two (2) sets of disposable protective clothing and a supply of protective clothing shall be kept in the airlocks attached to the regulated abatement work area.

(2) Location. The remote personal decontamination system shall be constructed as close to the regulated abatement work area as physically possible. If the remote personal decontamination system must be located at the exterior of the building/structure due to space or code restrictions, it shall be constructed within fifty (50) feet of the building/structure exit used for access by the asbestos abatement contractor personnel. The decontamination unit shall be cordoned off at a distance of twenty-five (25) feet to separate it from public areas.

(3) Airlocks. At a minimum, two (2) extra airlocks as defined in 12 NYCRR PART 56 Section 56-2.1 shall be constructed as per 12 NYCRR PART 56 Section 56-7.5(b)(11). One shall be constructed at the entrance to the equipment room or equipment/washroom. The other extra airlock shall be constructed at the entrance to the containment or regulated abatement work area(s). These airlocks shall have lockable doorways at the entrance to the airlock from uncontaminated areas. These airlocks shall be cordoned off at a distance of twenty-five (25) feet and appropriately signed in accordance with 12 NYCRR PART 56 Section 56-7.4(c). Airlocks shall not be used as a waste decontamination area and shall be kept clean and free of asbestos containing material.

(4) Designated Pathway. The walkway from the regulated abatement work area to the personal decontamination system or next regulated abatement work area shall be cordoned off and signage installed as per 12 NYCRR PART 56 Section 56-7.4(c), to delineate it from public areas while in use during Phase IIA through IID.

(5) Travel Through Uncontaminated Areas. If at any time a worker must travel through an uncontaminated area to access the personal decontamination area, the worker shall HEPA-vacuum and/or wet wipe his/her outer protective clothing while in the regulated abatement work area, then proceed into the airlock, which serves as a changing area, where he/she shall remove the outer clothing and don a clean set of protective clothing. The worker may then proceed to the personal decontamination system enclosure only along a designated pathway as described above. Travel in any other area shall not be allowed.

(6) Removal. The remote personal decontamination unit shall be removed only after satisfactory clearance air sampling results have been achieved.

E. Waste Decontamination System Enclosure - Large and Small Asbestos Projects.

(1) Enclosure – General. A waste decontamination system enclosure shall be provided outside the regulated abatement work area and shall be attached to the regulated abatement work area. One (1) waste decontamination enclosure for each regulated abatement work area shall be required. This system may utilize adequate existing lighting sources separate from the decontamination system enclosure, or shall be supplied with a GFCI protected temporary lighting system. The waste decontamination system enclosure shall be sized to accommodate the number of workers and equipment for the intended purpose. Such system may consist of existing attached rooms outside of the regulated abatement work area, if the layout is appropriate, that can be plasticized and are accessible from the regulated abatement work area. When this situation does not exist, enclosure systems may be constructed of metal, wood or plastic supports covered with fire-retardant plastic sheeting. A minimum of one (1) layer of six (6) mil fire-retardant plastic sheeting shall be installed on the ceiling, and walls of the enclosure system. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of this area. This system must be kept clean, sanitary and climate controlled at all times in conformance to all federal, state and local government requirements. This system shall remain and be used until completion of Phase II C of the asbestos project.

(2) Rooms and Configuration. A waste decontamination system enclosure shall consist of a washroom and a holding area connected in series but separated from each other by an airlock. There shall be a lockable door to the outside, and there shall be a curtained doorway between the washroom and the regulated abatement work area. (See Figure 2 in the 12 NYCRR PART 56)

(3) Curtained Doorway. An assembly which consists of at least three (3) overlapping sheets of six (6) mil fire retardant plastic over an existing or temporarily framed doorway. One (1) sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

(4) Washroom. A room/chamber between the regulated abatement work area and the holding area in the waste decontamination system enclosure, where equipment and waste containers are wet cleaned or HEPA-vacuumed. Adequate drainage and bag/container wash water shall be provided within the room/chamber, as well as a sufficient quantity of clean waste bags/containers.

(5) Equipment/Washroom Alternative. Where there is only one (1) exit from the regulated abatement work area, the holding area of the waste decontamination system enclosure may branch off from the equipment room of the personal decontamination system enclosure. The equipment room will also be used as a waste washroom. (See Figure 3 in the 12 NYCRR PART 56)

(6) Plastic Sheeting. Waste decontamination system enclosures constructed at the work site shall use at least one (1) layer of six (6) mil fire-retardant plastic sheeting on walls and ceiling. At least two (2) layers of six (6) mil fire-retardant reinforced plastic sheeting shall be used for flooring protection of these areas.

(7) Enclosure Security. The waste decontamination system enclosure and regulated abatement work area airlock(s) (when remote decontamination systems are used) shall be constructed with lockable doors to prevent unauthorized entry. Enclosures systems located within twenty-five (25) feet of an area of public access shall be fully framed and hard-wall sheathed for safety.

(8) Drains. The waste washroom shall be equipped with a wash bin of sufficient size to perform waste container washing operations and shall have a submersible pump installed to collect waste water and deliver it to the shower wastewater filtration system where it shall be filtered in accordance with paragraph (b)(9) of this Section.

(9) Shower/Washroom Alternative - Small Asbestos Project. For Small asbestos projects with only one (1) exit from the regulated abatement work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall be immediately removed from the enclosure. Waste shall

be transferred only during times when the showers are not in use. (See Figure 4 in this Section)

F. Waste Decontamination System Enclosure – When Remote Personal Is Allowed. When a remote personal decontamination system enclosure is allowed and utilized for a regulated abatement work area, the following requirements shall apply:

(1) Minor Size Regulated Abatement Work Area. No specific waste decontamination system enclosure is required for minor size regulated abatement work areas. The waste generated shall be immediately bagged/containerized within the regulated abatement work area.

(2) Small & Large Size Regulated Abatement Work Areas.

(i) Washroom. An additional chamber shall be constructed within the regulated abatement work area, attached to the existing airlock used to access the work area. The washroom/airlock combination shall be utilized as the contiguous waste decontamination enclosure for waste bagging/containerization and waste transfer activities. The washroom shall be constructed and supplied with equipment/materials consistent with waste decontamination system enclosure washroom requirements for contiguous personal and waste decontamination system enclosures.

(ii) Removal. The washroom chamber shall be removed only after satisfactory clearance air sampling results have been achieved

3.02 PERSONNEL PROTECTION AND DECONTAMINATION PROCEDURES:

A. General: The Contractor shall take all safety measures and precautions necessary to protect his/her employees and building occupants in accordance with OSHA Standard 29 CFR 1926, EPA Standard 40 CFR, Part 61, Subpart M, and applicable state and city regulations. The Contractor shall be solely responsible for enforcing personnel protection requirements.

1. After the installation of the personal decontamination system, full PPE in compliance with current OSHA regulations shall be worn in regulated abatement work areas during preparation activities, for all friable OSHA Class I or Class II asbestos projects. Asbestos abatement contractor’s respirator selection, filter selection, medical surveillance and respiratory training must be consistent with current OSHA regulations. Appropriate respiratory protection is also required of all authorized visitors.

2. Workers or authorized visitors shall not eat, smoke, drink, or chew gum or other substances while in the work area(s) or decontamination area(s).

3. Contaminated worker footwear, eye protection, and hard hats shall be stored in the equipment room when not in use in the work area and, upon completion of asbestos abatement, disposed of as asbestos-contaminated waste or decontaminated for reuse.

4. Entry to the personal and waste decontamination system enclosures shall be restricted to the asbestos contractors involved with the asbestos project, appropriately certified employees of the asbestos contractors, authorized visitors, police, fire and other public safety personnel.

5. Asbestos workers shall not wear any jewelry; e.g. watch, necklace, etc. while in the work area or decontamination area.

B. Worker Respiratory Protection: With approval from the Chappaqua CSD's Environmental Consultant, historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for the time interval prior to the Contractor establishing the eight-hour time weighted average (TWA) for an abatement task. Historical data provided by the Contractor shall be based on OSHA personal air monitoring of the "breathing zone" of his/her employees for other asbestos abatement projects, and the data were obtained during work operations conducted under work place conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations. Documentation of aforementioned results shall be presented to the Chappaqua CSD’s Environmental Consultant for review of applicability. (See "Submittal, Pre-Project

Information." This will not relieve the Contractor in providing personal air monitoring to determine the TWA for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101. After the TWA is established, the Contractor may provide respirators as presented in the Specification. The minimum level of protection for TSI and/or Surfacing Materials abatements is full face-piece Powered Air Purifying Respirator (PAPR).

1. Review safety data sheets (SDS) for products to be used during the work. Follow recommendations as given by the product manufacturer for personnel protection required to be worn during product application.

2. Personal Air Monitoring Requirements: The Contractor's CIH shall be responsible for development and implementation of a personal air monitoring program in accordance with OSHA Standard 29 CFR 1926.1101, good industrial hygiene practices, and the requirements herein. Personal air monitoring shall be performed by an independent testing laboratory and supervised by the Contractor's CIH. Documentation of air sampling shall include as a minimum, calculations of minimum sample volume to achieve necessary detection limits; sampling time; sampling location (or subject); evidence of periodic inspection of sampling equipment; documentation of daily pre- and post-calibration of sampling equipment; detailed description of worker protective devices; description of any typical environmental conditions; and a description of work practices/procedures/controls in operation during the sampling period. Documentation of sample analysis shall include, as a minimum, sample identification; total sample duration, sample flow rate; the "Limit of Reliable Quantification"; total air volume; total fibers counted (with work sheets); total fields counted; blank filter analysis; and reticule field area. Airborne fiber concentrations in fibers per cubic centimeter (f/cc) shall be calculated and reported at the 95 percent confidence level.

3. Full-shift personal exposure air sampling of workers shall be performed to establish the 8-hour (TWA) exposure. Such sampling shall be conducted for each employee (or representative group of employees, at least one sample per eight man crew) expected to evidence the highest exposure in each work area for each type of activity on the first shift that site preparation, removal, or cleanup activities occur. Similarly, 30-minute personal exposure air sampling shall be conducted during activities anticipated to produce the highest airborne concentrations to determine the Excursion Limit. Personal exposure sampling shall be repeated everyday as per protocol requirements where removal and cleanup operations are conducted for the duration of the project, or at any time that conditions indicate to the Contractor or the Contractor's CIH that the most recent personal sampling results are no longer indicative of employee exposure. PCM personal samples shall be collected and analyzed according to the OSHA Reference Method in OSHA Standard 29 CFR 1926.1101, Appendix B.

C. Personnel Entrance and Decontamination Procedures for entering and exiting a Regulated Abatement Work Area:

The following entry/exit procedures shall be used for gross removal:

1. All workers and authorized visitors shall enter the work area through the worker decontamination enclosure system.

2. All individuals who enter the work area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each work area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity.

3. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator (with new filters, if appropriate) and clean protective clothing before entering the work area through the shower room and equipment room.

4. Each worker or authorized visitor shall, each time he/she leaves the work area: remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove all clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

5. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the work area is not permitted outside the work area.

3.03 PREPARATION OF WORK AREA:

The following Paragraph "General Preparations" outlines procedures applicable to all work areas. Work procedures specific for preparing each asbestos removal area is addressed in its respective Subparagraph. If a site specific variance is approved, procedures outlined in the variance will supercede this specification.

A. General Preparations: The following general preparations shall be used for all work areas being abated:

1. Erect barricades; post notices and warning signs.

2. Provide and install decontamination enclosure systems in accordance with Article 3.01, "Decontamination Enclosure Systems" of this Section.

3. Seal drains and other collection devices with 6-mil plastic and plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.

4. Ensure that the Contractor's approved Fall Protection Equipment (if applicable) is in place, in operating condition, and in operation during work described in this section.

5. Maintain emergency and fire exits from the work areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the work area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

6. Temporary lighting within the work area and decontamination system shall be provided as required to achieve minimum illumination levels.

7. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be equipped by manufacture with HEPA filtered local exhaust ventilation.

8. Hot and cold water may not be available in all work areas. In such cases sufficient heating equipment shall be provided to maintain a necessary supply of hot water for showers.

B. Interior Negative Pressure Tent Enclosure:

1. Tent enclosure work areas shall at a minimum have decontamination areas installed and utilized.

2. Tents with greater than twenty (20) square feet of floor space, that are scheduled for gross removal of friable ACM, PACM, or asbestos material, shall be constructed of two (2) layers of six (6) mil fire-retardant plastic sheeting and shall include walls, ceiling and a floor (except for portions of walls, floors and ceilings that are the removal surface) with double folded seams. Seams shall be duct taped airtight and then duct taped flush with the adjacent tent wall.

3. Tents with no gross removal of friable ACM, PACM or asbestos material, shall be constructed of one (1) layer six (6) mil fire-retardant plastic sheeting and shall include walls, ceiling and a floor (except for portions of walls, floors and ceilings that are the removal surface) with double –folded seams. Seams shall be duct taped airtight and then duct taped flush with the adjacent tent wall.

4. Tents or tent-like structures or enclosures shall be adequately supported and

reinforced to withstand local environmental conditions and the negative pressures developed within them.

5. An airlock shall be constructed as per Section 56-7.5(b)(11), at the entrance to each tent that utilizes remote decontamination system facilities. Each tent and airlock shall be cordoned off twenty-five (25) feet from it perimeter, or the interior space/room where the tent and airlock is located shall be secured from non-certified personnel or public access, and signage shall be installed as per Section 56-7.4(c).

6. All electric power in the work area shall be shut down and locked out. In

   a) the event this is not possible as per 56-7.7 (c), the live electric shall be maintained within those conduits, cables, panels and boxes as per following conditions: All live cables, electrical panels and boxes that run through the work areas shall be wrapped with three (3) layers of 6-mil plastic sheeting. Each layer shall be individually taped and sealed separately. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air monitoring results have been obtained.

   b) Any energized circuits remaining in the work areas shall be posted with a two (2) inch high lettering warning sign which reads: DANGER-LIVE ELECTRICAL-KEEP CLEAR. The sign shall be placed on all live covered barriers at maximum of (10) ten-foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work areas of the existence of the energized circuits.

   c) All electrical power for the removal project shall be brought into the work area through a separate GFCI panel box located outside the work area.

7. Manometers consistent with the requirements of Section 56-7.8(a)(4), are required for negative pressure tent enclosure regulated abatement work areas with OSHA Class I 12 NYCRR 56 Subpart 7, Page 69 abatement. 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. If a HEPA-filtered vacuum is used for a Minor size abatement tent enclosure work area to maintain the required air changes, after final cleaning is completed twenty (20) minutes shall elapse, then ventilation may be stopped, clearance air samples collected if required, and the tent sealed until results are read. If air sample results are unacceptable, ventilation shall be re-established, the area recleaned and new samples taken.

8. A four (4) hour pre-abatement settling period is required prior to commencement of ACM removal activities.

B. Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs.

1. 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. 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 of 12 NYCRR Part 56. 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.

   a. 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

2. 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 of 12 NYCRR Part 56.

3. Decontamination System Location. The personal 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) of 12 NYCRR Part 56.

4. Critical Barriers. Prior to the placement of critical barriers, affected surfaces shall be pre-cleaned using HEPA-filtered vacuum equipment and wet cleaning methods. All openings within the regulated abatement work area shall be sealed with critical barriers installed as per Section 56-7.11(a) of 12 NYCRR Part 56, prior to beginning Phase II B activity on the project. The critical barriers shall be removed only after satisfactory clearance air sampling results have been obtained or the asbestos project is complete. The 12 NYCRR 56 Subpart 11, Page 106 requirements of Section 56-7.11(b-e) do not apply.

3.04 PRE-REMOVAL INSPECTIONS:

A. Prior to removal of any ACM the Contractor shall notify the Chappaqua CSD's Environmental Consultant and request a pre-removal inspection. Posting of warning signs, plasticizing of work area, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of Chappaqua CSD's Environmental Consultant. The Contractor shall not begin asbestos removal until the Chappaqua CSD's Environmental Consultant approves the work area preparations.

3.05 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS:

A. Repair damaged barriers and remedy any defects immediately upon their discovery. Visually inspect barriers at the beginning and end of each work period.

B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of twice each 8- hour work shift.

C. Ensure that both hot and cold water exist in sufficient supply for the decontamination enclosure system.

3.06 REMOVAL OF ASBESTOS-CONTAINING MATERIAL:

The Asbestos Contractor shall be responsible for the proper removal of ACM from the Work Area using standard abatement industry removal techniques. The Environmental Consultant or their representative shall observe the Work. Approval of the Asbestos Contractor’s abatement techniques is required by the Environmental Consultant to allow for the continuance of work.

A. Removal of asbestos containing materials in Negative Pressure Tent Enclosures and Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs work areas:

1. Materials removed shall be containerized or immediately wrapped in two (2) layers of six (6) mil fire retardant plastic sheeting and secured airtight prior to removal from the regulated work area and transport to the waste decontamination facility. Residual asbestos containing materials shall be wet scraped, HEPA vacuumed or otherwise collected by manual means and likewise containerized and secured airtight prior to removal from the regulated work area and transported to the waste decontamination facility.

2. Asbestos containing materials will not be allowed to accumulate in the work area

B. Additional Removal Requirements:

1. Chappaqua CSD's Environmental Consultant shall issue a stop work order if visible emissions are detected outside the work areas and/or should the fiber count in adjacent non-work areas exceed 0.01 f/cc of air or the background count (use the greater of these two values as the reference). Work shall not resume until the condition(s) causing the increase are corrected, surfaces outside of the work area are decontaminated using HEPA vacuums or wet cleaning techniques and the Contractor receives written notice from Chappaqua CSD's Environmental Consultant.

3.07 ACM WASTE PACKAGING AND LOAD OUT PROCEDURES:

A. Packaging of ACM shall conform to OSHA Standard 29 CFR 1926.1101, DOT 49 CFR 171,172, and 173, EPA Standard 40 CFR Part 61, New York City Department of Sanitation (in relation to transport, storage, and disposal of ACM) and the requirement as heretofore specified. ACM waste shall be placed in a wet condition into properly labeled disposal bags or sealed in two layers of 6-mil plastic sheeting wrapped airtight and properly labeled. Materials to be transported through a non-Work Area building space shall be placed in hard wall shipping containers for handling. Specific requirements for decontamination of waste containers, and load out through the decontamination enclosure systems is outlined below:

B. Frequency of Waste Removal: Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site. The waste hauler and landfill shall be as indicated on the notifications to regulatory agencies.

C. Waste Load-out Through Waste Decontamination Unit: Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick plastic sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil plastic sheeting, as the item’s physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.

D. The clean containerized items shall be moved directly to the Waste Hauler’s truck pending load-out to storage or disposal facilities.

E. Workers who have entered the decontamination enclosure system from the uncontaminated non-work area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.

F. Thoroughly clean the decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

G. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, whether turned inside out or not, shall be handled and disposed of as ACM waste.

3.08 CLEANUP AND CLEARANCE TESTING OF WORK AREAS:

The following cleanup procedures shall be performed during abatement.

A. 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.

B. 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.

C. Interior Negative Pressure Tent Enclosure removal methods:

1. All accumulations of asbestos waste material shall be containerized and removed. HEPA-vacuums shall be used to clean all surfaces after gross removal.

2. Contaminated equipment and all containerized waste shall be removed from the regulated abatement work area.

3. All surfaces in the regulated abatement work area shall be wet-cleaned using rags, mops or sponges.

4. Negative pressure HEPA-ventilated air equipment shall operate until final clearance is achieved.

5. Once final cleaning is complete, a visual inspection shall be completed by the asbestos abatement contractor’s supervisor to confirm that the scope of abatement work for the asbestos project is complete, and no visible debris/residue, pools of liquid, or condensation remain.

6. The appropriate post-abatement settling/drying period will be observed, depending on the type and quantity of material remove, prior to commencement of final clearance air sampling.

7. When the work area receives passing final clearance air sampling results, all controls and seals of the work area may be broken down.

D. Exterior Project Removal of Non-friable ACM Roofing, Siding, Caulking, Glazing Compound, Transite, Tars, Sealers, Coatings, and Other NOB ACMs removal methods.

1. 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.

2. 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.

3. Final Cleaning and Clearance Procedures. 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.

3.09 DISPOSAL AND TRANSPORTATION OF ASBESTOS-CONTAMINATED WASTE:

A. Storage of Containerized ACM: As the work progresses, remove sealed and labeled bags of ACM from the Work Area and place in a lockable trailer, dumpster, or other container approved for storage or transport of asbestos waste. The waste container shall be lined with two layers of 6-mil fire retardant plastic on all sides. Asbestos-containing waste shall remain under the positive control of the Asbestos Contractor and must never be left unattended in an area or on a vehicle where unauthorized persons could gain access. Containerized ACM shall be removed from the site on a daily basis. Unless specifically approved in writing by the Owner, ACM shall not be permitted to be stored on site during non-working hours.

B. Sealed and labeled bags or waste wrapped in two layers of plastic sheeting sealed airtight shall be used to transport asbestos-contaminated waste to the landfill. Procedures for hauling and disposal shall comply with 40 CFR, Part 61, 49 CFR, Part 171 and 172, and other applicable state, regional, and local government regulations. Procedures for removal from the Work Area and disposal of waste are outlined below:

C. A properly completed and original "Waste Shipment Record" form shall accompany asbestos waste, which is transported to a disposal site. This form shall be signed and dated by each party who has control over the asbestos waste, and a copy retained by each party as responsibility for the waste is transferred to the next party. All original manifest forms and waste receipts shall be provided to the Architect. The Environmental Consultant shall be provided with copies of all waste manifests.

D. Trucks hauling asbestos waste shall be totally enclosed to prevent loss or damage to waste container en-route to approved landfill. The interior of the vehicles shall be lined with two layers of 6-mil plastic.

E. Mark with a visible warning sign during the loading and unloading of asbestos-containing waste all vehicles used to transport the waste material. Danger sign

legend, text size, style and arrangement shall conform to the requirements of EPA Standard 40 CFR Part 61.149 (d) (I).

F. Only sealed plastic bags or completely sealed items shall be deposited in landfill. Damaged, broken sealed windows or leaking plastic bags shall be resealed prior to being deposited in the landfill. Workers shall place asbestos waste in the landfill. Throwing or dumping of containers shall not be allowed. Workers unloading and handling the sealed bags/drums at the disposal site shall wear appropriate personnel protective equipment including respirators and protective clothing.

G. After the vehicle is unloaded at the landfill, the plastic sheeting that was taped to the floor, sides and top of the truck shall be carefully removed and placed in properly labeled bags for disposal with the rest of the waste.

END OF SECTION

LIST OF SUBMITTALS

	SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Pre-Project Submittal:			
1.	Insurance	_____	_____
2.	All required bonds	_____	_____
3.	List of Subcontractors	_____	_____
4.	Health and Safety Plan	_____	_____
5.	Proof that all required permits and variances have been obtained	_____	_____
6.	Documentation of Required Qualifications of Workers	_____	_____
7.	Proof of a respiratory protection program.	_____	_____
8.	Proof of historic airborne fiber data.	_____	_____
9.	Proof that a landfill site has been located.	_____	_____
10.	SDS of chemicals to be used on this project.	_____	_____
11.	Asbestos Removal and Disposal Work Plan	_____	_____
During Work Submittal:			
1.	Schedule of Work Changes	_____	_____
2.	Notarized copy of weekly payroll showing a prevailing wage rate has been paid.	_____	_____
	A "Request For Services" form.	_____	_____
3.	Results of all air monitoring performed by the Contractor (OSHA)	_____	_____

SUBMITTAL	DATE SUBMITTED	DATE
4. A certified, signed, and completed copy of each " Waste Shipment Record" form (Section 1.07)	_____	_____
5. A copy of the bound log book	_____	_____

Post Project Submittal:

1. A notarized "Release of Liens"	_____	_____
2. Proof of payment of prevailing wage rate	_____	_____
3. Notarized copies of a daily log.	_____	_____
4. Compilation in chronological order of all air monitoring records pertaining to this project.	_____	_____
5. Compilation of all completed and signed Waste Shipment Record forms.	_____	_____
6. Copies of notifications to applicable agencies.	_____	_____
7. Paid invoice verifications for sub-contractor (for Time and Material job), service contract agreement, insurance certificates, copies of the workers licenses, and other required submittals.	_____	_____

DRAWINGS

ASBESTOS ABATEMENT
GENERAL NOTES

GENERAL NOTES:

1. ALL ASBESTOS REMOVAL SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAW, GUIDELINES, REGULATIONS, ORDERS AND DIRECTIVES, INCLUDING WITHOUT LIMITATIONS, THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), AND U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH), AND NEW YOK STATE DEPARTMENT OF LABOR (NYSDOL).

2. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, ETC., NECESSARY TO PERFORM THE WORK REQUIRED FOR ASBESTOS ABATEMENT IN ACCORDANCE WITH CONTRACT DOCUMENTS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

3. CONTRACTOR SHALL DEVELOP AND IMPLEMENT A WRITTEN STANDARD PROCEDURE FOR ABATEMENT WORK TO ENSURE MAXIMUM PROTECTION AND SAFEGUARD FROM ASBESTOS EXPOSURE OF THE WORKERS, VISITORS, EMPLOYEES, GENERAL PUBLIC, AND THE ENVIRONMENT.

4. CONTRACTOR SHALL PROVIDE SIGNS, LABELS, WARNINGS, AND POST INSTRUCTIONS THAT ARE NECESSARY TO PROTECT, INFORM AND WARN PEOPLE OF THE HAZARD FROM ASBESTOS EXPOSURE. POST IN A PROMINENT AND CONVENIENT PLACE FOR THE WORKERS A COPY OF THE LATEST APPLICABLE REGULATIONS FROM OSHA, EPA, NIOSH AND NYSDOL.

5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATION.

6. THE CONTRACTOR SHALL RELOCATE ALL FURNITURE, LOCKERS, DESKS AND OTHER MISC. ITEMS IN AND OUT OF THE WORK AREAS TO ACCOMODATE ASBESTOS ACTIVITIES, IF THE SCHOOL DOES NOT PROVIDE.

7. THE CONTRACTOR SHALL PROVIDE ALL ELECTRICAL, WATER, AND WASTE CONNECTIONS, TIE–INS, EXTENSIONS, CONSTRUCTION MATERIALS, SUPPLIES, ETC. AS REQUIRED TO FACILITATE ASBESTOS REMOVAL, IF THE SCHOOL DOES NOT PROVIDE.

8. CONTRACTOR SHALL PROVIDE TEMPORARY ELECTRIC AND LIGHT THROUGHOUT THE WORK AREA(S) AS REQUIRED IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND CODES.

9. CONTRACTOR SHALL PROPERLY PROTECT ALL CONTROLS, TUBING, ELECTRICAL PANELS, EQUIPMENT, ETC. WITHIN THE WORK AREA.

10. THE CONTRACTOR SHALL BE REQUIRED TO ISSUE NON–WHITE WORK COVERALLS FOR ALL ABATEMENT WORKERS.

11. CONTRACTOR SHALL EXERCISE EXTREME CARE AND CAUTION DURING ANY AND ALL DEMOLITION AND ABATEMENT OPERATIONS. CONTRACTOR SHALL CONDUCT REMOVAL OF ALL MATERIALS FROM THE SITE WITH MINIMUM DISTURBANCE; PROVIDE PROPER PROTECTION AND REGULAR MAINTENANCE OF ALL BUILDING PREMISES DIRECTLY OR INDIRECTLY ASSOCIATED WITH ABATEMENT OPERATIONS.

12. THE CONTRACTOR SHALL USE A WATER SPRAYER TO WET ASBESTOS CONTAINING MATERIALS INSIDE THE WORK AREA.

13. CONTRACTOR SHALL CONSTRUCT A PERSONAL/WASTE DECONTAMINATION ENCLOSURE SYSTEM (P./W.D.E.S.) AS INDICATED. IT SHALL BE OF SUFFICIENT SIZE TO ACCOMMODATE STORAGE OF MATERIALS, EQUIPMENT, ETC.

14. IF WATER IS NOT AVAILABLE, THE CONTRACTOR SHALL PROVIDE A 55 GALLON WATER TANK FOR THE DECONTAMINATION UNIT.

15. THE CONTRACTOR SHALL UTILIZE GFCI PANEL CONNECTIONS AT THE SOURCE OUTLET WHEN ACCESSING TEMPORARY POWER.

16. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE TEMPORARY WATER AND POWER SOURCES PRIOR TO ABATEMENT ACTIVITIES.

17. DEBRIS RESULTING FROM ANY DEMOLITION AND/OR ASBESTOS ABATEMENT ACTIVITIES SHALL BE DISPOSED OF AS ASBESTOS CONTAMINATED WASTE.

18. NO WASTE SHALL BE STORED ON SITE OR INSIDE THE DECONTAMINATION UNIT BETWEEN SHIFTS. WASTE SHALL BE DOUBLE BAGGED BEFORE PROCEEDING TO THE CONTAINER AND/OR DECON. BAGS WILL BE MOVED FROM WORK AREAS TO THE WASTE DECON AND SUBSEQUENTLY TO THE CONTAINER IN COVERED CARTS. BAGS WILL BE CARRIED BY HAND ONLY WHEN NECESSARY. ALL WASTE SHALL BE CONTAINERIZED AT THE END OF EACH WORK SHIFT BEFORE RELINQUISHING TO WASTE HAULER.

19. CONTRACTOR IS RESPONSIBLE TO COORDINATE AND CONFIRM THE EXACT SCOPE OF WORK, AND QUANTITY FOR EACH PHASE OF ABATEMENT WITH THE GENERAL CONTRACTOR AND OTHER TRADES.

20. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, TOOLS, TRANSPORTATION AND ANY OTHER EQUIPMENT REQUIRED AND/OR NECESSARY TO COMPLETE ALL WORK DESCRIBED IN THE CONTRACT DOCUMENTS.

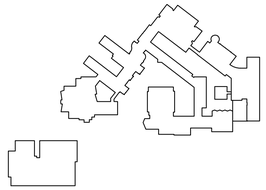
DRAWING	DRAWING NAME
H-001.00	ASBESTOS ABATEMENT - GENERAL NOTES
H-002.00	ASBESTOS ABATEMENT - ROOF PLAN
H-003.00	ASBESTOS ABATEMENT - GYMNASIUM FLOOR PLAN

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

N

KEY PLAN

Horace Greeley High School



ENVIRONMENTAL CONSULTANT

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CHAPPAQUA Central School District

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

HORACE GEELEY HIGH SCHOOLSCHOOL
70 ROARING BROOK ROAD,
CHAPPAQUA, NY 10514

DRAWING TITLE:
ASBESTOS ABATEMENT
GENERAL NOTES

DRAWN BY:	D. RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	H-001.00

DRAWING NUMBER: 1 of 3

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CONSULTANTS PROJECT #: 101134406

ROOF PROTECTION NOTES:

1. AVOID WALKING ON NEW AND EXISTING ROOF AREAS.

2. DO NOT STORE MATERIAL OR EQUIPMENT, AND DO NOT PILE DEBRIS ON NEW AND EXISTING ROOF AREAS.

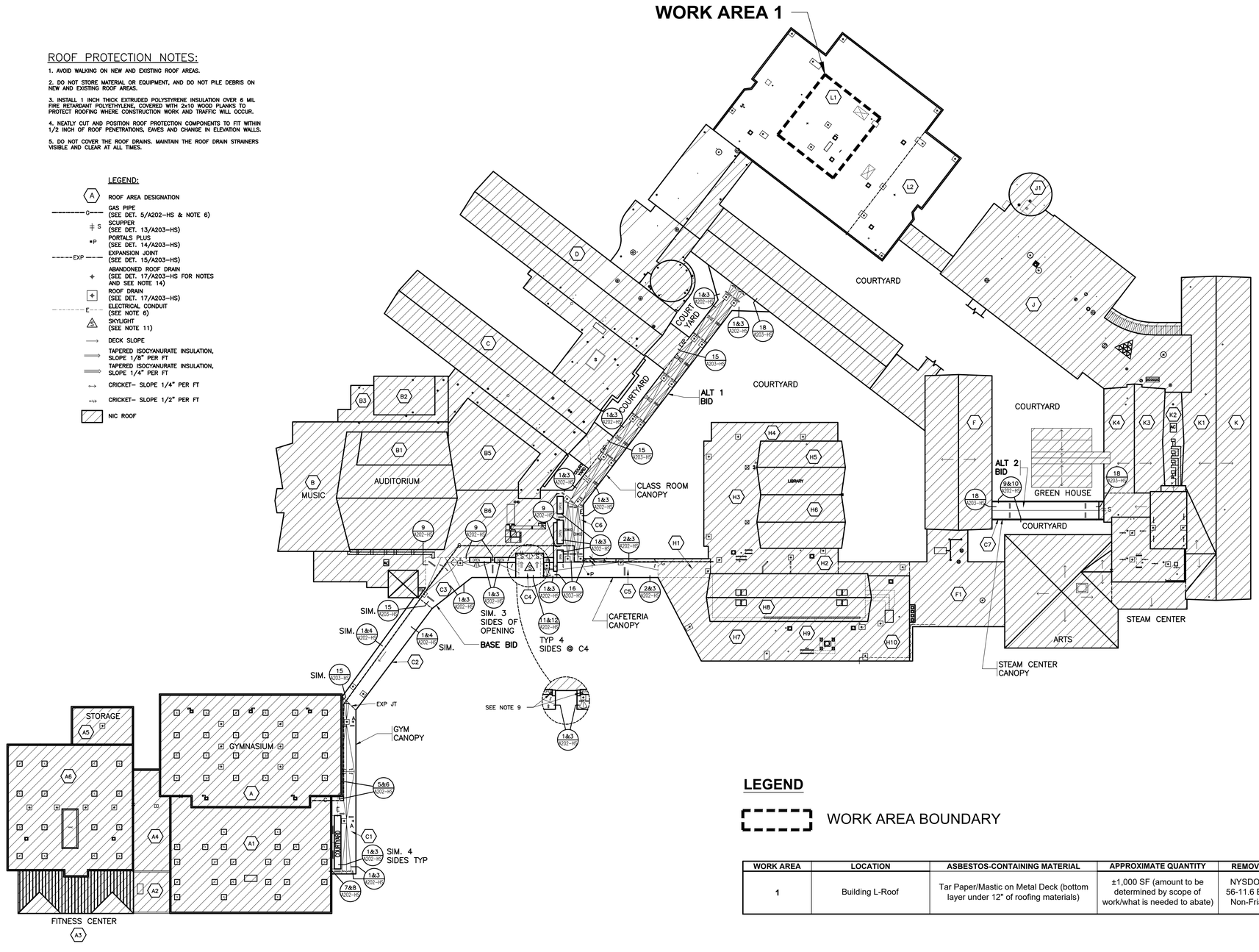
3. INSTALL 1 INCH THICK EXTRUDED POLYSTYRENE INSULATION OVER 6 MIL FIRE RETARDANT POLYETHYLENE, COVERED WITH 2x10 WOOD PLANKS TO PROTECT ROOFING WHERE CONSTRUCTION WORK AND TRAFFIC WILL OCCUR.

4. NEATLY CUT AND POSITION ROOF PROTECTION COMPONENTS TO FIT WITHIN 1/2 INCH OF ROOF PENETRATIONS, EAVES AND CHANGE IN ELEVATION WALLS.

5. DO NOT COVER THE ROOF DRAINS. MAINTAIN THE ROOF DRAIN STRAINERS VISIBLE AND CLEAR AT ALL TIMES.

LEGEND:

- A — ROOF AREA DESIGNATION
- G — GAS PIPE (SEE DET. 5/A202–HS & NOTE 6)
- S — SCUPPER (SEE DET. 13/A203–HS)
- P — PORTALS PLUS (SEE DET. 14/A203–HS)
- EXP — EXPANSION JOINT (SEE DET. 15/A203–HS)
- ABANDONED ROOF DRAIN (SEE DET. 17/A203–HS FOR NOTES AND SEE NOTE 14)
- ROOF DRAIN (SEE DET. 17/A203–HS)
- E — ELECTRICAL CONDUIT (SEE NOTE 6)
- S — SKYLIGHT (SEE NOTE 11)
- DECK SLOPE
- TAPERED ISOCYANURATE INSULATION, SLOPE 1/8" PER FT
- TAPERED ISOCYANURATE INSULATION, SLOPE 1/4" PER FT
- CRICKET– SLOPE 1/4" PER FT
- CRICKET– SLOPE 1/2" PER FT
- NIC ROOF



LEGEND

WORK AREA BOUNDARY

WORK AREA	LOCATION	ASBESTOS-CONTAINING MATERIAL	APPROXIMATE QUANTITY	REMOVAL PROCEDURES
1	Building L-Roof	Tar Paper/Mastic on Metal Deck (bottom layer under 12" of roofing materials)	±1,000 SF (amount to be determined by scope of work/what is needed to abate)	NYSDOL 12 NYCRR Part 56-11.6 Exterior Removal of Non-Friable ACM Roofing

1 ROOF PLAN
SCALE: NTS

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

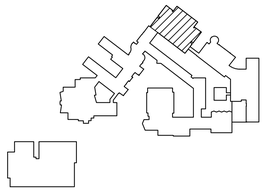
NOTE:

1. LIMITED SHEETROCK/JOINT COMPOUND WALLS NOT TO BE AFFECTED BY CURRENT SCOPE OF WORK, ONLY CEILINGS.

N

KEY PLAN

Horace Greeley High School



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CHAPPAQUA, NY 10514

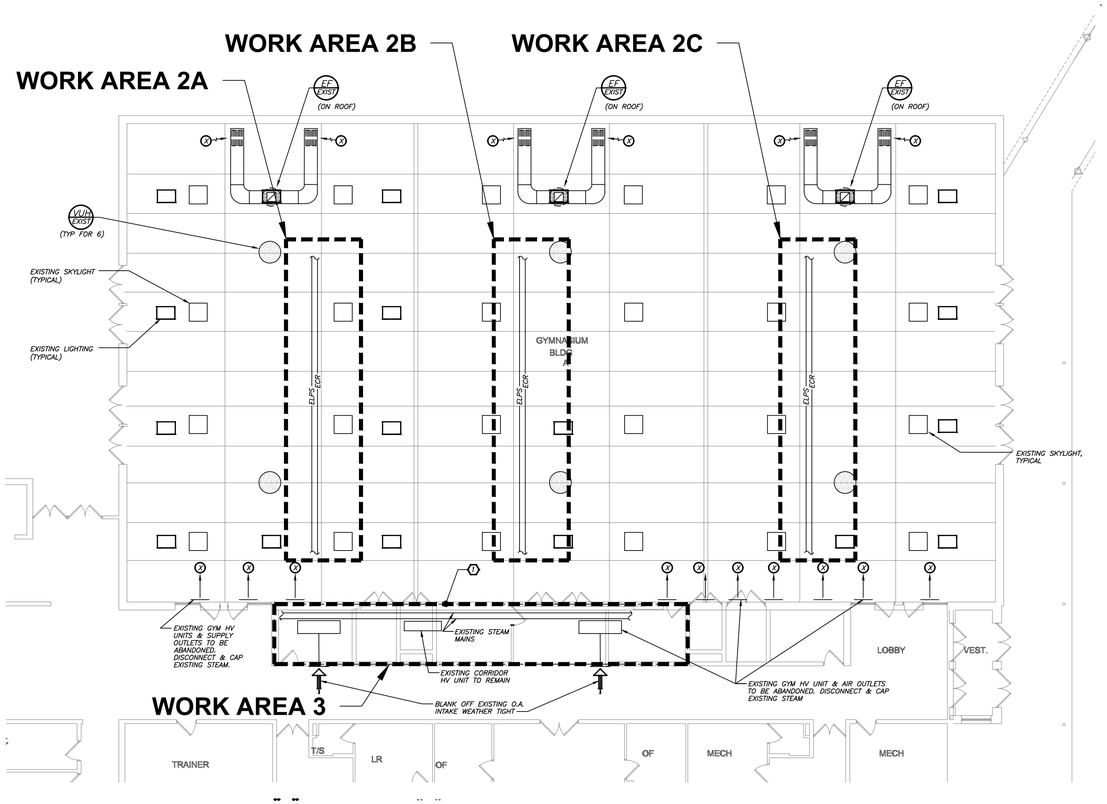
DRAWING TITLE:
ASBESTOS ABATEMENT ROOF PLAN

DRAWN BY:	D. RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	H-002.00

CONSULTANTS PROJECT #: 101134406

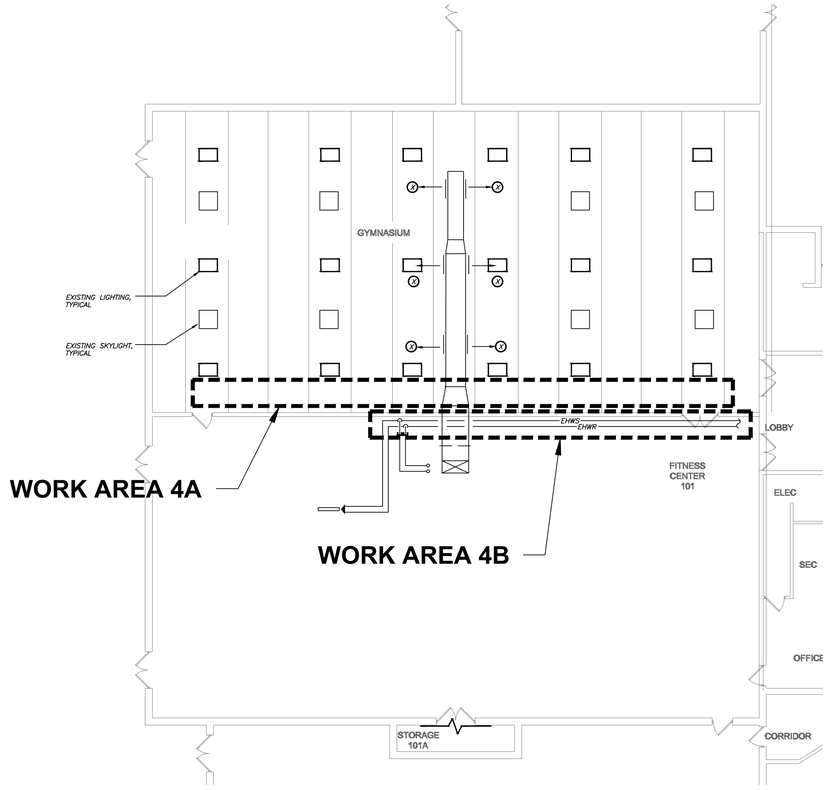
NOTES:

1. **WORK AREAS ARE NEAR THE CEILING, SCAFFOLDING WILL NEED TO BE ERECTED ALONG WITH TENT/GLOVEBAG.**



1 GYMNASIUM FLOOR PLAN

SCALE: NTS



2 FITNESS ROOM FLOOR PLAN

SCALE: NTS

LEGEND

WORK AREA BOUNDARY

WORK AREA	LOCATION	ASBESTOS-CONTAINING MATERIAL	APPROXIMATE QUANTITY	REMOVAL PROCEDURES
2A	Building A, Main Gym, Near ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE (on scaffolding near ceiling)
2B	Building A, Main Gym, Near ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	
2C	Building A, Main Gym, Near ceiling	Pipe Insulation/Fittings	6 LF (amount to be determined by actual scope of work as needed)	
3	Building A, Main Gym Mechanical Room	Pipe Insulation/Fittings	150 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE
		Duct Insulation Coating, White/Gray	±500 SF (amount to be determined by actual scope of work as needed	NYSDOL 12 NYCRR Part 56-7 FULL CONTAINMENT/SEQUENTIAL REMOVAL
		Duct Insulation Pin Mastic, Black		
4A	Building A, Small Gym	Pipe Insulation/Fittings/Roof Drain Insulation (4 Locations)	40 LF (amount to be determined by actual scope of work as needed)	NYSDOL 12 NYCRR Part 56-11.7.11 (1)(i) NEGATIVE PRESSURE TENT ENCLOSURE (on scaffolding near ceiling)
4B	Building A, Fitness Center	Pipe Insulation/Fittings	15 LF (amount to be determined by actual scope of work as needed)	

DESIGNER: ROBERT S. MASONE, P.E. LIC. # 084951

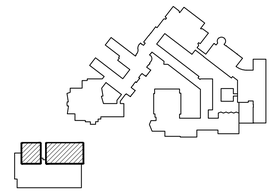
NOTE:

1. LIMITED SHEETROCK/JOINT COMPOUND WALLS NOT TO BE AFFECTED BY CURRENT SCOPE OF WORK, ONLY CEILINGS.

N

KEY PLAN

Horace Greeley High School



ENVIRONMENTAL CONSULTANT

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CHAPPAQUA Central School District

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		

HORACE GEELEY HIGH SCHOOLSCHOOL
70 ROARING BROOK ROAD,
CHAPPAQUA, NY 10514

DRAWING TITLE:

ASBESTOS ABATEMENT GYMNASIUM FLOOR PLAN

DRAWN BY:	D. RUSSO-LABRIOLA	SCALE:	NOT TO SCALE
PROJ. DESIGNER:	R. MASONE	DATE:	10/01/2024
CHECKED BY:	C. NAPOLITANO	DRAWING NUMBER:	**H-003.00**

DRAWING NUMBER: 3 of 3

CONSULTANTS PROJECT #: 101134406

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building or structure.
2. Salvage of selected building components and elements.
3. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 01 General Requirements for temporary construction and environmental-protection measures for selective demolition operations.
2. Division 01 General Requirements for cutting and patching procedures for selective demolition operations.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Proposed Dust-Control, Noise-Control and Other Special Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

C. 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.
3. Coordination for shutoff, capping, and continuation of utility services.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Professional Engineer Qualifications: Comply with Division 01 General Requirements.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 General Requirements.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of site and buildings immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 2 weeks' notice to Owner of activities that will affect Owner's operations.

B. Owner may elect to salvage certain items from areas of construction other than those indicated on Drawings as “salvage” prior to selective demolition operations. Give 2 weeks notice to Owner prior to commencing any selective demolition processes to allow for Owner salvage operations.

C. Maintain access to existing walkways, roadways, and other adjacent occupied or used facilities.

1. Do not close or obstruct walkways, roadways, or other occupied or used facilities without written permission from authorities having jurisdiction.

D. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

E. Hazardous Materials: Remediation of existing hazardous materials, if any, will be completed prior to commencement of selective demolition in the areas where hazardous materials are present.

1. If materials suspected of containing hazardous materials that have not been previously identified in the Contract Documents are encountered, do not disturb; immediately notify Architect and Owner.
2. A hazardous materials report is included in the Specifications for information only.

F. Storage or sale of removed items or materials on-site will not be permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

H. Cutting and Patching of Existing Roofing System: Contractors performing cutting and patching of the existing roof membrane shall be certified installers by the existing roof membrane manufacturer for their products. When existing roofing system is still under warranty, coordinate all work on the existing roofing system with manufacturer. All cutting and patching work on roofing system shall be performed in a manner that does not void the warranty.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Do not interrupt existing utilities serving occupied 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 and to authorities having jurisdiction.

1. Provide at least 2 weeks' notice to Owner if shutdown of service is required during changeover.

C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
4. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent site improvements, structures and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Provide special protection measures as required by Owner.

D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and 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 needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects

E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

F. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

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

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

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

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

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

3.5 SELECTIVE DEMOLITION

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

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

B. Removed and Salvaged Items: Comply with the following:

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: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Salvage items indicated on the Drawings as “salvage”.

E. Existing Facilities: Comply with Owner’s requirements for using and protecting elevators, stairs, walkways, building entries, and other building facilities during selective demolition operations.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

G. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

H. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

I. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

J. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 01 Section "Cutting and Patching."

C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

E. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

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

B. Burning: Do not burn demolished materials.

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

END OF SECTION 024119

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction contraction and isolation joints.
c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.
3. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:
2. Mechanical splice couplers.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

B. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60, deformed bars, assembled with clips.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheet

2.2 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.
3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install structural thermal break insulated connection system in accordance with manufacturer's instructions.

H. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

J. Dual-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

K. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and

slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.
e. Special concrete finish Subcontractor.

2. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, control joints, isolation joints, and joint-filler strips.
c. Semirigid joint fillers.
d. Vapor-retarder installation.
e. Anchor rod and anchorage device installation tolerances.

f. Cold and hot weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement
7. Aggregates.
8. Admixtures:

    a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

9. Fiber reinforcement.
10. Vapor retarders.
11. Floor and slab treatments.
12. Liquid floor treatments.
13. Curing materials.

    a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.

14. Joint fillers.
15. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.

6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Steel-fiber reinforcement content.
10. Synthetic micro-fiber content.
11. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
12. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
13. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
14. Intended placement method.
15. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

    a. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.

5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:

    a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete, incorporating permeability-reducing admixtures.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Field Quality-Control Testing Agency Qualifications: An independent agency,

acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.
f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 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 deg 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 in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. 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.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:

a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.

2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260/C260M.

B. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

2.4 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types I and II, nonload bearing Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.5 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 50 percent by mass.
3. Silica Fume: 10 percent by mass.
4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete with a w/cm below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
5. Use permeability-reducing admixture in concrete mixtures where indicated.

2.7 CONCRETE MIXTURES

A. Normal-weight concrete used for footings.

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum w/cm: 0.55.
3. Air Content:

   a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.

4. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

B. Normal-weight concrete used for foundation walls.

1. Minimum Compressive Strength: As indicated at 28 days.
2. Maximum w/cm: As indicated on construction documents
3. Air Content:

a. Exposure Class F1: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.

4. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

C. Normal-weight concrete used for interior slabs-on-ground.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum w/cm: 0.45.
3. Air Content:

a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

4. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

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.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

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.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.

a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

a. Continue reinforcement across construction joints unless otherwise indicated.
b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at

slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. 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.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

    a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
    b. Remove projections larger than 1 inch.
    c. Tie holes do not require patching.
    d. Surface Tolerance: ACI 117 Class D.
    e. Apply to concrete surfaces not exposed to public view.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish.

D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

    a. Slabs on Ground:

        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
        2) Specified overall values of flatness, FF 25; and of levelness, FL 20; with minimum local values of flatness, FF 17; and of levelness, FL 15.
        3) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
        4) Specified overall values of flatness, FF 45; and of levelness, FL 35; with minimum local values of flatness, FF 30; and of levelness, FL

24.

5) Specified overall values of flatness, FF 50; and of levelness, FL 25; with minimum local values of flatness, FF 40; and of levelness, FL 17.

b. Suspended Slabs:

1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
2) Specified overall values of flatness, FF 25; and of levelness, FL 20; with minimum local values of flatness, FF 17; and of levelness, FL 15.
3) Specified overall values of flatness, FF 35; and of levelness, FL 20; with minimum local values of flatness, FF 24; and of levelness, FL 15.
4) Specified overall values of flatness, FF 45; and of levelness, FL 35; with minimum local values of flatness, FF 30; and of levelness, FL 24.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and

associated items.

1. Cast-in inserts and accessories, as shown on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

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) 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.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

   a) Water.
   b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

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) 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.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

   a) Water.

b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:

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) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

d. Floors to Receive Chemical Stain:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
3) Butt sides of curing paper tight; do not overlap sides of curing paper.
4) Leave curing paper in place for duration of curing period, but not less than 28 days.

e. Floors to Receive Urethane Flooring:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

f. Floors to Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing

period.

4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer[unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project].

g. Floors to Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117.

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least [one] [six] month(s).
2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect'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 Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and 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 0.01 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. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane,

and level surface.
b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. 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.

8. 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.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.

2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.
        11) Concrete mixture designation, proportions, and materials.
        12) Field test results.
        13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
        14) Type of fracture and compressive break strengths at seven days and 28 days.

C. 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.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with 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 to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

   a. 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.
   b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:

   a. 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.
   b. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;

   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

   a. 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.

6. Compression Test Specimens: ASTM C31/C31M:

   a. Cast and laboratory cure two sets of four 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C39/C39M.

   a. Test one set of three laboratory-cured specimens at seven days and one set of two specimens at 28 days.
   b. Test one set of three field-cured specimens at seven days and one set of two specimens at 28 days.
   c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. 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 if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.

10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests:

    a. Testing and inspecting agency to 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 Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 72 hours of completion of floor finishing and promptly report test results to Architect.

3.15 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel materials.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

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 anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shop primer.

B. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand-critical welds.

C. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Mill test reports for structural-steel materials, including chemical and physical properties.

D. Survey of existing conditions.

E. Source quality-control reports.

F. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE.

C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1. Welders and welding operators performing work on bottom-flange, demand-critical welds are to pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G are to be considered separate processes for welding personnel qualification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

2.2 STRUCTURAL-STEEL MATERIALS

A. Channels, Angles: ASTM A36/A36M.

B. Plate and Bar: ASTM A36/A36M.

C. Welding Electrodes: Comply with AWS requirements.

2.3 PRIMER

A. Steel Primer:

1. SSPC-Paint 23, latex primer.
2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.

4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.5 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces to be field welded.
2. Surfaces of high-strength bolted, slip-critical connections.
3. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
4. Galvanized surfaces unless indicated to be painted.
5. Corrosion-resisting (weathering) steel surfaces.
6. Surfaces enclosed in interior construction.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 14 (WAB)/NACE WAB-8.
5. SSPC-SP 11.
6. SSPC-SP 6 (WAB)/NACE WAB-3.
7. SSPC-SP 10 (WAB)/NACE WAB-2.
8. SSPC-SP 5 (WAB)/NACE WAB-1.
9. SSPC-SP 8.

C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of **1.5 mils**. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.6 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E165/E165M.
b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
c. Ultrasonic Inspection: ASTM E164.
d. Radiographic Inspection: ASTM E94/E94M.

3. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:

a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.
b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.

4. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads

and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Maintain erection tolerances of structural steel within ANSI/AISC 303.

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

D. Splice members only where indicated.

E. Do not use thermal cutting during erection**.**

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

B. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.

    a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

        1) Liquid Penetrant Inspection: ASTM E165/E165M.
        2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
        3) Ultrasonic Inspection: ASTM E164.
        4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 051200

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Loose steel lintels.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.2 ACTION SUBMITTALS

A. Product Data: For all fabricated products including the following:

1. Paint products.
2. Grout.

B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.3 INFORMATIONAL SUBMITTALS

A. Welding Certificates: Copies of certificates for welding procedures and personnel.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions 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 metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. 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.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications 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.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating.

C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads. For exterior installations and where indicated, provide pipe with hot-dip galvanized coating.

D. Slotted Channel Framing: Cold-formed metal channels with flange edges returned toward web and with 9/16-inch- (14.3-mm-) wide slotted holes in webs at 2 inches (51 mm) o.c.

1. Width of Channels: 1-5/8 inches (41 mm).
2. Depth of Channels: As indicated.
3. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
4. Finish: Unfinished.

E. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).

F. Gray-Iron Castings: ASTM A 48, Class 30 (ASTM A 48M, Class 200), unless another class is indicated or required by structural loads.

G. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

H. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

A. Shop Primer for Interior Ferrous Metal: Modified oil-alkyd primer, Tnemec 88-559 or 10-1009, or equivalent. Primer shall be compatible with finish paint specified in Section 099100.

B. Shop Primer for Galvanized Ferrous Metal: Polyamide epoxy primer, Tnemec F.C. Typoxy Series 27, or equivalent. Primer shall be compatible with finish paint specified in Section 09900.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

D. Shop Primer for Exterior Ferrous Metal: Organic zinc-rich primer, complying with SSPC-Paint 20 and compatible with topcoat; Tneme-Zinc 90-97; Tnemec Company, Inc.

2.4 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls, except as noted below. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.

G. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).

H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. 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. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. 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.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.7 ROUGH HARDWARE

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.8 LOOSE STEEL LINTELS

A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

B. Weld adjoining members together to form a single unit where indicated.

C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches (200 mm), unless otherwise indicated.

D. Galvanize loose steel lintels located in exterior walls.

E. Shop prime and field paint all lintels, leave embedded portions of lintels unpainted.

2.9 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.

B. Fabricate units from structural-steel shapes, plates, tubes, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate units from slotted channel framing where indicated.
2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long at 24 inches (600 mm) o.c., unless otherwise indicated.
3. Furnish inserts if units must be installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated, and in exterior locations.

2.10 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware..

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes indicated as unpainted, and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
2. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. 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.

E. 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.

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, if any.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood blocking, cants, furring, supports, and nailers.
2. Plywood backing panels.

1.2 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.

1.5 QUALITY ASSURANCE

A. All composite wood, engineered wood, or agrifber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings..

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.
3. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, and Use Category UC3b for exterior construction not in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. The use of CCA preservative treated wood is prohibited.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

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.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply 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 E84, 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 D2898. 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 D3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency

2.4 MISCELLANEOUS LUMBER

A. Provide miscellaneous lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.
4. Sleepers
5. Cants

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and the following species: Mixed southern pine; SPIB.

C. For concealed boards, provide lumber with 19 percent maximum moisture content of the following species and grades:

1. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.

2.5 PLYWOOD PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch (12.7 mm) thick.

1. Paint before mounting of equipment.

B. Miscellaneous Concealed Plywood: Exposure 1 sheathing, span rating to suit framing in each location, and thickness as indicated but not less than ½ inch (13 mm).

1. Provide fire-retardant-treated panels for interior locations unless indicated.
2. Provide preservative-treated panels for exterior locations unless indicated.

2.6 MISCELLANEOUS MATERIALS

A. Fasteners:

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
2. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.7 ACCESSORY MATERIALS

A. Weather Resistant Barrier: Asphalt-saturated organic felt, ASTM D 226, Type 1 (No. 15 asphalt felt), unperforated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. 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, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 PANEL PRODUCT INSTALLATION

A. Fastening Methods: Fasten panels as indicated below:

1. Plywood Backing Panels: Screw to supports.
2. Miscellaneous Concealed Plywood Panels: Screw to supports.

3.3 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 061053

SECTION 076200 - SHEET METAL FLASHING, FABRICATIONS AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes sheet metal flashing, fabrications and trim in the following categories:

1. Metal flashing.
2. Sheet metal pipe enclosures at exterior walls.

1.2 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

1.3 SUBMITTALS

A. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

B. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

C. Samples for Verification: Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 8-inch- (200-mm-) square Samples of specified sheet materials to be exposed as finished surfaces.

D. 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.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Copper Work Standard: Comply with the Revere Copper's "Copper and Common Sense" design manual. Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.5 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS

A. Zinc-Tin Coated Copper: Copper sheet, coated on both sides, with a smooth uniform coating of zinc and tin, nominal weight as scheduled for each application, cold rolled temper, available as FreedomGray Copper by Revere.

B. Copper: ASTM B 370; temper H00, cold rolled except where temper 060 is required for forming; nominal weight as scheduled for each application.

1. Finish: Natural, mill finish

C. Aluminum: 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 of alloy and temper designated below:

1. Aluminum Sheet: ASTM B 209, Alclad 3003-H14, with a minimum thickness as indicated.
2. Extruded Aluminum: ASTM B 221, alloy 6063-T52, with a minimum thickness of 0.080 inch for primary legs of extrusions, unless otherwise indicated

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

B. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead, used with rosin flux.

C. Solder for Zinc-Tin Coated Copper: ASTM B 32, 100 percent tin, with maximum lead content of 0.2 percent (lead-free), as recommended by sheet metal manufacturer.

1. Basis of Design Product: Johnson #497 *SuperFlo*™ by Johnson Manufacturing Company, Princeton, Iowa or equal approved by sheet metal manufacturer.

D. Flux for Zinc-Tin Coated Copper: 'Tin-loaded" type flux as recommended by sheet metal manufacturer.

1. Basis of Design Product: Johnson E-127 Flux-'N-Solder with Pure Tin by Johnson Manufacturing Company, Princeton, Iowa or equal approved by sheet metal manufacturer.

E. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.

F. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

G. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 07 Section "Joint Sealants."

H. Silicone Seam Sealer: ASTM C 920, of base polymer, type, grade, class, and use classifications required to produce joints in sheet metal that will remain weathertight and as recommended by the manufacturer for installation indicated. Provide 791 by DOW or equal.

I. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints

J. Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

K. Slip Sheet: 3-lb. rosin-sized building paper or Tyvek by DuPont.

L. Self-Adhering, High-Temperature Sheet: 30 to 40 mils (0.76 to 1.0 mm) thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.
   b. GCP Applied Technologies; Ultra.
   c. Henry Company; Blueskin PE200 HT.
   d. Drexel Metals Inc.; MetShield.
   e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

M. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

N. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

2.3 FABRICATION, GENERAL

A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual, Revere Copper's "Copper and Common Sense" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams in Zinc-Tin Coated Copper and Copper: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder where soldered joints are indicated. Use specified joint sealant in seams indicated to receive sealant.

C. Seams in Aluminum: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

D. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches (600 mm)of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25.4 mm) deep, filled with mastic sealant (concealed within joints.)

E. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

F. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

G. Conceal fasteners and expansion provisions unless noted otherwise. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

H. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Sheet Metal Covers for Pipes at Exterior Walls: Fabricate from the following material:

1. Copper 36 oz.

C. Counterflashing, Flashing Receivers, and Step Flashing: Fabricate from the following material in locations as indicated on Drawings:

1. Zinc-Tin-Coated Copper 16 oz.
2. Copper: 16 oz.
3. Aluminum: 0.032 inch thick

D. Base Flashings: Fabricate from the following material in locations as indicated on Drawings:

1. Zinc-Tin-Coated Copper: 20 oz.
2. Copper: 20 oz.
3. Aluminum: 0.040 inch thick

2.5 ALUMINUM FINISHES

A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.

B. High-Performance Organic 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 manufacturers' written instructions.

1. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
2. Color: Match existing

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, Revere Copper's "Copper and Common Sense" and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, 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 and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Isolation: Where metal surfaces of units are installed in contact with dissimilar metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation as recommended by sheet metal producer.

D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

E. Soldered Joints for Zinc-Tin Coated Copper and Copper: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except where pretinned surface would show in finished Work.

1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
2. Do not pretin zinc-tin alloy-coated copper

F. Sealed Joints in Aluminum: Form nonexpansion, but movable, joints in aluminum to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

G. Seams in Aluminum: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

H. Seams in Zinc-Tin Coated Copper and Copper Sheet: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder where soldered joints are indicated. Use specified joint sealant in seams indicated to receive sealant.

I. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing copper or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper over one layer of felt underlayment before installing sheet metal.
2. Bed flanges in a thick coat of roofing cement where required for waterproof performance.

J. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches (50 mm) and bed with sealant.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 076200

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in fire-resistance-rate horizontal assemblies.
3. Penetrations in non-fire-resistance-rate horizontal assemblies.
4. Penetrations in smoke barriers, smoke partitions and smoke tight partitions.

B. Related Sections:

1. Section 078446 "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.2 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.

1.3 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.

1.4 QUALITY ASSURANCE

A. 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.

B. 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."
      2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
      3) FM Global in its "Building Materials Approval Guide."

C. Preinstallation Conference: Conduct conference at Project site.

1.5 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.

1.6 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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Penetration Firestop Systems specified in the Schedule in Part - 3 include:
   a. Fire Barrier Products, 3M Fire Protection Products
   b. RectorSeal Corporation.

2. Subject to compliance with specified requirements, provide Penetration Firestop Systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory (BXRH), by one of the following:
   a. Hilti, Inc.
   b. Nelson Firestop Products.
   c. RectorSeal Corporation.
   d. Specified Technologies Inc.
   e. 3M Fire Protection Products.
   f. Wiremold/Legrand

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 and floor/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. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. 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.

H. 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.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. 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. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. For penetrations in non-fire rated horizontal assemblies, smoke barriers, smoke partitions and smoke tight partitions, provide systems tested for 1 hour unless otherwise noted.

C. Basis of Design Assemblies: Subject to compliance with requirements, provide the design indicated below or a comparable UL design by one of manufacturer’s listed in Part 2 above.

1. Schedule of construction components, type of penetrant, and U.L. Penetration Firestop Systems include, but are not limited to the following:
2. Schedule of construction components, type of penetrant, and U.L. Penetration Firestop Systems include, but are not limited to the following:

	P E N E T R A N T						
	Metal Conduit	**Cable Tray[4]**	**Cables**	**Non-Insul. Metal Pipe**	**Insul. Pipe**	**FR Polypro-pylene Pipe**	**Insul. Metal Duct**

	PENETRANT						
	Metal Conduit	**Cable Tray[4]**	**Cables**	**Non-Insul. Metal Pipe**	**Insul. Pipe**	**FR Polypro-pylene Pipe**	**Insul. Metal Duct**
GWB Stud Wall, or Shaft Wall up to 2 Hr Rating	W-L-1001	W-L-4004	W-L-3001	W-L-1001	W-L-5011	W-L-2002	W-L-7006 [3]
CMU Wall up to 2 Hr Rating	C-AJ 1044	C-AJ-4003	C-AJ-3030	C-AJ-1044	C-AJ-5001	C-AJ-2001	C-AJ-7003[3], 7016[3]
Concrete Floor / Metal Deck 1 Hr Rated F and T-Rating[2]	C-AJ-1008	N/A	C-AJ-3029	C-AJ-1008	C-AJ-5002	F-A-2002	C-AJ-7009[5]
Concrete Floor / Metal Deck 2 Hr Rated F and T-Rating[2]	C-AJ-1008	N/A	C-AJ-3029	C-AJ-1008	C-AJ-5060	F-A-2002	N/A
Concrete Floor / Metal Deck up to 2 Hr F Rated[1]	F-A-1002	N/A	C-AJ-3030	C-AJ-1044	C-AJ-5001	F-A-2002	N/A

KEY TO NOTES

1. Penetration within wall cavity.
2. Penetration that does not fall within wall cavity, T-Rating required.
3. Up to 1 hour rating, submit engineered judgement firestopping system for this combination of penetrant, wall/floor assembly, and fire rating. Install fire dampers in 2-hour walls in accordance with manufacturer's instructions and testing agency requirements.
4. Where cable tray extends through wall.
5. For floor penetrations not enclosed above and below the floor with shaft wall.

D. Membrane Penetrations:

1. Firestop membrane penetrations by cables, pipes and conduit similar to through wall penetrations.
2. Provide putty pad box wrap firestopping for membrane penetrations in rated walls for electrical back boxes over 16 sq. inches, where any back boxes are located within 24 inches horizontal of another back box, or when total area of back boxes exceeds 100 sq in. in 100 sq. ft. of wall area.

E. Where another type of construction or penetrant is encountered, or if field conditions vary from those described in the U.L. System listed (i.e. annular space is greater/smaller, insulation type varies, etc.), provide firestopping systems which are appropriate, and U.L. tested, for that condition.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints in smoke barriers.

B. Related Sections:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Firestopping Submittal Form attached at the end of this section, indicating the U.L. design test for each condition that exists.

1. Attach UL test reports or test reports from a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on the condition indicated for each penetrant and condition

C. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.

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.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating fire-resistive joint systems have 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 fire-resistive joint systems.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing fire-resistive joint systems 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 fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

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.
2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
    a. Fire-resistive joint system products bear classification marking of qualified testing agency.
    b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
        1) UL in its "Fire Resistance Directory."

C. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

C. Notify Owner's testing agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

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: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:

1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Grace Construction Products.
    b. Hilti, Inc.
    c. RectorSeal Corporation.
    d. Specified Technologies Inc.
    e. 3M Fire Protection Products.
    f. Tremco, Inc.; Tremco Fire Protection Systems Group.

C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.

1. L-Rating: Not exceeding 5.0 cfm/ft (0.00775 cu. m/s x m) of joint at 0.30 inch wg (74.7 Pa) at both ambient and elevated temperatures.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Grace Construction Products.
    b. Hilti, Inc.
    c. Johns Manville.
    d. RectorSeal Corporation.
    e. Specified Technologies Inc.
    f. 3M Fire Protection Products.
    g. Tremco, Inc.; Tremco Fire Protection Systems Group.

D. 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.

E. 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.

F. 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 EXAMINATION

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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. 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 fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system 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 fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems 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 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.

C. 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.

3.4 IDENTIFICATION

A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) 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.

3.5 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.

3.6 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 FIRE-RESISTIVE JOINT SYSTEM / FIRESTOP JOINT SYSTEM SCHEDULE

A. Where UL-classified firestop joint systems are indicated, they refer to alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.

Firestop Joint System Location	**Basis-of-Design**	**Assembly Rating**	**Nominal Joint Width**	**Movement Capabilities [2]**
Floor-to-Wall				
Rated concrete masonry wall construction intersection with adjacent floor construction	FW-D-1012, FW-D-1013	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Class II
Head-of-Wall				
Rated gypsum wall construction intersection with steel floor deck above	HW-D-0087, or HW-D-0089	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Class II or III,
Rated gypsum wall construction intersection with concrete floor deck above	HW-D-0083, HW-D-209	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Class II
Rated concrete masonry wall construction intersection with steel floor deck above	HW-D-0081, or HW-D-0098	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Class II
Rated concrete masonry wall construction intersection with concrete floor deck above	HW-D-0268, HW-D-0097	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Class II
Bottom-of-Wall				
Rated gypsum wall construction intersection with concrete floor	BW-S-0002	1 hour or 2 hours[1]	As indicated, or required by tested assembly	Static

1. Rating to match wall construction.
2. Class UL2079

B. Where another type of construction is encountered, or if field conditions vary from those described in the U.L. System listed (i.e. annular space is greater/smaller, insulation type varies, etc.), provide firestopping systems which are appropriate, and U.L. tested, for that condition.

END OF SECTION 078446

ATTACHMENT: FIRESTOP JOINT SYSTEMS SUBMITTAL SHEET

3.8 FIRESTOP JOINT SYSTEMS SUBMITTAL SHEET

A. **HEAD-OF-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Gypsum wall construction intersection with floor deck above: _____. Gypsum wall construction intersection with roof deck above: _____.
2. Concrete masonry wall construction intersection with floor deck above: _____.
3. Concrete masonry wall construction intersection with roof deck above: _____.

B. **FLOOR-TO-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Concrete masonry wall construction intersection with adjacent floor construction: _____.

C. **BOTTOM-OF-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Gypsum wall construction intersection with floor deck: _____. Gypsum wall construction intersection with roof deck above: _____.
2. Concrete masonry wall construction intersection with floor _____.
3. Concrete masonry wall construction intersection with roof deck above: _____.

D. **CURTAIN WALL FIRESTOPPING:** Fill in the design number and copy test. Insert n/a if condition is not applicable.

1. Aluminum mullion and glass spandrel panel curtainwall intersection with adjacent floor construction:
2. Gypsum sheathed curtainwall intersection with adjacent floor construction: _____.

E. **OTHER:** Where another type of construction or penetrant is encountered, attach a separate sheet listing each condition and attach copy of the U.L. Test.

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following locations:

1. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

a. Perimeter joints between interior wall surfaces and frames of interior door frames, and borrowed lite frames.
b. Openings and joints in sound-rated partitions.
c. Other joints as indicated.

2. Interior joints in the following horizontal traffic surfaces:

a. Joints as indicated.

B. Related Sections include the following:

1. Coordinate work of this section with all sections referencing it.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

C. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples 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.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

B. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project names addresses, names of Architects and Owners, plus other information specified.

C. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.

D. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.

E. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an installer who has successfully completed at least three (3) joint sealer applications similar in type and size to that of this project within the last five (5) years. All workers used for work of this Section shall be experienced in the techniques of sealant application and shall be completely familiar with the published recommendations of the manufacturer of the joint sealant materials being used.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:

1. Locate test joints where indicated or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:
   a. Each type of elastomeric sealant and joint substrate indicated.
   b. Each type of non-elastomeric sealant and joint substrate indicated.
3. Notify Architect one week in advance of the dates and times when mock-ups will be erected.
4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants by hand pull method described below:
   a. Install joint sealants in 60 inches (1500 mm)) joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
   b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches (50 mm) long at side of joint and meeting horizontal cut at top of 2-inch (50-mm) cuts. Place a mark 1 inch (25 mm) from top of 2-inch (50-mm) piece.

c. Use fingers to grasp 2-inch (50-mm) piece of sealant just above 1-inch (25-mm) mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.

6. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
7. Evaluation of Field 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.

D. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:

1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

E. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 01 Section covering this activity.

F. Random Field Tests: Periodically test sealants, in place, for adhesion, using methods recommended by sealant manufacturer. Promptly replace any sealant that does not adhere, fails to cure, or fails to perform as specified by the sealant manufacturer.

G. Field Water Test: Perform two field water tests on completed areas including as many conditions as possible. If leakage occurs during testing, repair as required, and re-test area and also test two additional locations.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4 deg C).

2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.9 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer’s Warranty: Provide written warranty agreeing to repair or replace, at no cost to Owner, defective materials for twenty (20) years, and workmanship for two (2) years from the Date of Substantial Completion. Defective materials and workmanship shall include, but are not limited to:

1. Deterioration, aging or weathering of the work;
2. Water leakage and/or air leakage;
3. Sealant loss of adhesion, loss of cohesion, cracking or discoloration;
4. Staining or discoloration of adjacent surfaces;
5. Joint failure due to building or joint movement up to the limits prescribed by the manufacturer;
6. Cracks or bubbles on sealant surface.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide selections made by Architect from manufacturer’s standards or custom colors to match Architect's samples, as directed by Architect.

C. Additional Movement Capability: Where additional movement capability is specified, provide products with the capability, when tested for adhesion and cohesion under

maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.

D. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 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.

E. 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

2.2 LATEX JOINT SEALANT

A. Acrylic-Emulsion Sealant: Manufacturer's standard, one part, nonsag, mildew-resistant, paintable latex acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior locations involving joint movement of not more than plus or minus 5 percent.

1. Available Products: Subject to compliance with requirements, latex joint sealants that may be incorporated in the Work include, but are not limited to, the following:
   a. AC-20; Pecora Corporation.
   b. Tremflex 834; Tremco.
   c. ALEX PLUS; DAP .

B. Uses: General interior use, paintable.

2.3 MILDEW-RESISTANT SILICONE JOINT SEALANT

A. Single-Component Mildew-Resistant Silicone Sealant: Manufacturer's standard, non-modified, one-part, silicone sealant; complying with ASTM C 920, Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to non-porous joint substrates indicated, O. Formulate sealant with fungicide and specifically intended for sealing interior joints with nonporous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes.

1. Available Products: Subject to compliance with requirements, silicone joint sealants that may be incorporated in the Work include, but are not limited to, the following:
   a. 786 Mildew Resistant; Dow Corning.
   b. Sanitary 1700; GE Silicones.
   c. 898 Silicone Sanitary Sealant; Pecora Corporation.
   d. Tremsil 600 White; Tremco.

B. Uses: Interior use in wet locations, and all toilet and shower rooms.

2.4 POURABLE URETHANE JOINT SEALANT

A. Multicomponent Pourable Urethane Sealant: Manufacturer's standard, non-modified, two-part, urethane sealant; complying with ASTM C 920, Type M, Grade P, Class 25, Uses T, M, A and, as applicable to joint substrates indicated, O.

1. Available Products: Subject to compliance with requirements, urethane joint sealants that may be incorporated in the Work include, but are not limited to, the following:
   a. NR-200 Urexpan, Pecora Corporation
   b. Sikaflex 2c SL, Sika Corporation
   c. Masterseal SL 2; Master Builders Solutions Div., BASF

B. Uses: Interior or exterior use for level pavement or slab joints.

2.5 NONSAG URETHANE JOINT SEALANT

A. Multi-Part Non-Sag Urethane Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, two-part, urethane sealant; complying with ASTM C 920, Type M, Grade NS, Class 25, Uses T, M, A and, as applicable to joint substrates indicated, O.

1. Available Products: Subject to compliance with requirements, urethane joint sealants that may be incorporated in the Work include, but are not limited to, the following:
   a. Sikaflex 2c NS; Sika Corp
   b. Dynatred, Pecora Corporation
   c. Masterseal NP 2; Master Builders Solutions Div., BASF

B. Uses: Interior or exterior use for pavement or slab joints where slope exceeds one percent.

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant: Non-sag (gun grade), non-flammable, latex-based sealant designed to limit sound transmission through interior STC-rated partitions. Sealant remains flexible and adhered to metal, wood, plaster, gypsum, and concrete after drying.

1. Maintains the STC rating of partitions with intersections and penetrations sealed with product: Tested by independent, accredited, NVLAP facility according to ASTM E 90.
2. Products: Provide one of the following:
   a. QuietZone Acoustic Sealant by Owens Corning.
   b. OSI GreenSeries SC-175 Draft & Acoustical Sound Sealant by Henkel Corporation
   c. Pecora AIS-919: Acoustical and Insulation Latex Sealant by Pecora Corporation

d. Smoke 'N' Sound Acoustical Sealant by Specified Technologies Inc.

B. Uses: At penetrations through and intersections of sound-rated wall, floor and ceiling assemblies in order to preserve their ability to reduce airborne sound impact noise transmission.

2.7 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
2. Manufacturer: Provide Cera-Rod manufactured by W.R. Meadows, Inc., or equivalent.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.8 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 in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions

affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer 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 concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of

installed sealants relative to joint widths that allow optimum sealant movement capability.

a. Do not leave gaps between ends of joint fillers.
b. Do not stretch, twist, puncture, or tear joint fillers.
c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 that and installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following hollow-metal work:

1. Steel doors
2. Steel door frames
3. Fire-rated door and frame assemblies

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. 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.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance 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. 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.

1.6 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.

1.7 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. Republic Doors and Frames.

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 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.

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. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. Provide for interior door and frame locations.

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 16 gage 0.053 inch (1.3 mm), except as noted below.
        1) Metallic-coated, with minimum A40 (ZF120) coating at the following locations: As scheduled.

    d. Edge Construction: Model 1, Full Flush
    a. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
        1) Provide mineral core for fire rated doors

3. Frames:

    a. Materials: Minimum thickness of 16 gage, 0.053 inch (1.3 mm), uncoated, steel sheet for the following locations:
        1) Wood doors, unless otherwise indicated.

    b. Materials: Minimum thickness of 14 gage, 0.067 inch (1.7 mm), uncoated, steel sheet (except provide metallic coated where door is metallic coated) for the following locations:
        1) Level 3 steel doors

    c. Construction: Full profile welded.

4. Exposed Finish: Prime door and frames.

2.4 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.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. 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.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. 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.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

H. 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.

I. 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.

2.6 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 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 flush closures 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.

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. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
3. 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.
4. 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.

c. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

5. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
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.

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.

2.7 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.

2.8 ACCESSORIES

A. 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, and for electrical wiring as required, 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 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. 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.

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.

END OF SECTION 081113

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall access doors and frames for interior locations.
2. Fire-rated wall access doors and frames for interior locations
3. Ceiling access doors and frames for interior locations.
4. Fire-rated ceiling access doors and frames for interior locations.

B. Locations and Quantities of Access Doors: Not all access doors are shown on the Drawings. It is the intent of this section that access doors be provided wherever access is required for operation and maintenance of concealed equipment, dampers, valves, controls or similar devices.

C. Cylinders for access doors are specified in Division 08 Section "Door Hardware."

D. Related Requirements:

1. Division 07 Section "Roof Accessories" for roof hatches.
2. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, 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. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article

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 PRODUCTS, GENERAL

A. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

2.3 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

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. Babcock-Davis.
2. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
3. Karp Associates, Inc.
4. Larsen's Manufacturing Company.
5. Milcor Inc.
6. Nystrom, Inc.

B. Flush Access Doors, with Exposed Trim, for CMU Surfaces: Units consisting of frame with exposed trim, door, hardware, and complying with the following requirements

1. Basis-of-Design Product: Karp Model DSC-214M, Universal Flush Access Door.
2. Assembly Description: Fabricate door to fit flush to frame. Provide flange integral with frame, 3/4 inch (19 mm) wide, overlapping surrounding finished surface.
3. Locations: Provide at non-rated concrete block walls.
4. Uncoated Steel Sheet for Door: Nominal 0.074 inch (1.9 mm), 14 gage.
   a. Finish: Factory prime.

5. Stainless-Steel Sheet for Door for Toilet Rooms**,** Shower Rooms, and Other Wet Areas: Nominal 0.074 inch (1.9 mm), 14 gage; No. 4 finish.
6. Frame Material: Nominal 0.060 inch (1.52 mm), 16 gage
7. Hinges: Concealed continuous piano hinge.
8. Latches: Self-latching key-operated bolt type, with interior release; for locking.

C. Trimless, Flush Access Doors for Gypsum Board Surfaces: Units consisting of frame, concealed edge trim, door, hardware, and complying with the following requirements:

1. Basis-of-Design Product: Karp KDW for drywall
2. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
3. Locations: Provide at non-rated gypsum board walls and ceilings.
4. Uncoated Steel Sheet for Door: Nominal 0.074 inch (1.9 mm), 14 gage.
   a. Finish: Factory prime.

5. Stainless-Steel Sheet for Door for Toilet Rooms**,** Shower Rooms, and Other Wet Areas: Nominal 0.074 inch (1.9 mm), 14 gage; No. 4 finish.
6. Frame Material: Nominal 0.060 inch (1.52 mm), 16 gage.
7. Hinges: Concealed continuous piano hinge.
8. Latches: Self-latching key-operated bolt type, with interior release; for locking.

D. Recessed Doors for Acoustical Ceiling Tiles: Units consisting of frame with no exposed trim, recessed door to receive tile, hardware, and complying with the following requirements.
   1. Basis-of-Design Product: Karp, Model DSC-210, Recessed Acoustical Ceiling Tile Access Doors.
   2. Locations: Provide at non-rated acoustical ceilings tiles.
   3. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage thick steel sheet; recessed 1-inch (25.4 mm).
      a. Finish: Factory prime.
   4. Stainless-Steel Sheet for Door for Toilet Rooms**,** Shower Rooms, and Other Wet Areas: Nominal 0.060 inch (1.52 mm), 16 gage; No. 4 finish.
   5. Frame Material: Nominal 0.074 inch (1.9 mm), 14 gage.
   6. Hinges: Concealed, pivoting-rod type.
   7. Latches: Self-latching key-operated bolt type, with interior release; for locking.

E. Insulated, Fire-Rated Access Doors for Drywall Walls and Ceilings: Units consisting of frame with gypsum board bead concealed edge trim, self-latching insulated door, and hardware, and complying with the following requirements:

   1. Basis-of-Design Product: Karp, Model KRP-350FR, Insulated Fire Rated Access Door, with Drywall Bead, for Walls and Ceilings.
   2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release.
   3. Locations: Provide at rated gypsum board walls and ceilings.
   4. Fire-Resistance Ratings:
      a. Walls: 1-1/2 hours.
      b. Ceilings: 3 hours.

   5. Uncoated Steel Sheet for Door: 20 ga., 0.0359-inch- (0.91-mm-) thick steel sheet, welded pan type, filled with 2-inch (50 mm) thick fire-rated mineral-fiber insulation.
      a. Finish: Factory prime.

   6. Stainless-Steel Sheet for Door for Toilet Rooms**,** Shower Rooms, and Other Wet Areas: Same gage and style as steel door; with No. 4 finish.

7. Frame Material: 16 ga., 0.0598-inch- (1.52-mm-) thick steel sheet, 1-inch (25.4 mm) wide, surrounded by galvanized drywall bead.
8. Hinges: Concealed continuous piano hinge.
9. Hardware: Self-latching key-operated bolt type, with interior release; for locking.

F. Insulated, Fire-Rated Access Doors for CMU Walls: Units consisting of frame with exposed edge trim, self-latching insulated door, and hardware, and complying with the following requirements:

1. Basis-of-Design Product: Karp, Model KRP-150FR, Insulated Fire Rated Access Door, with Exposed Flange, for Walls and Ceilings.
2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide flange integral with frame, 1 inch (25 mm) wide, overlapping surrounding finished surface. Provide self-latching door with automatic closer and interior latch release.
3. Locations: Provide at rated concrete block walls.
4. Fire-Resistance Ratings:
   a. Walls: 1-1/2 hours.

5. Uncoated Steel Sheet for Door: 20 ga., 0.0359-inch- (0.91-mm-) thick steel sheet, welded pan type, filled with 2-inch (50 mm) thick fire-rated mineral-fiber insulation.
   a. Finish: Factory prime.

6. Stainless-Steel Sheet for Door for Toilet Rooms**,** Shower Rooms, and Other Wet Areas: Same gage and style as steel door; with No. 4 finish.
7. Frame Material: 16 ga., 0.0598-inch- (1.52-mm-) thick steel sheet, 1-inch (25.4 mm) wide exposed trim.
8. Hinges: Concealed continuous piano hinge.
9. Hardware: Self-latching key-operated bolt type, with interior release; for locking.

G. Hardware:

1. Lock: Cylinder, keyed alike for project
2. Lock for Fire Rated Access Doors: Rim cylinder.
   a. Lock Preparation: Prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. 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.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.

E. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

F. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

G. Frame Anchors: Same type as door face.

H. 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.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. Non-Rated Doors: For cylinder locks, furnish two keys per lock and key all locks alike.
2. Fire-Rated Doors: Cylinder and keys are specified in Section 087100 "Door Hardware."

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, VOC-free, electrostatic-applied powder coat finish immediately after surface preparation and pretreatment.

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.

F. Aluminum Finishes:

1. Mill finish and factory primed, as specified.

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. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. 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.

END OF SECTION 083113

SECTION 086300 - METAL-FRAMED SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes aluminum-framed skylights with the following characteristics:

1. Glazing is multiwall polycarbonate.
2. Glazing is retained by field-installed pressure caps on four sides

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for sealants installed at perimeters of metal-framed skylights.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality and Code Requirements," to design metal-framed skylights.

B. Provide metal-framed skylights, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure.
4. Dimensional tolerances of building frame and other adjacent construction.

C. Failure includes the following:

1. Deflection exceeding specified limits.
2. Water leakage.
3. Thermal stresses transferred to building structure.
4. Noise or vibration created by wind and thermal and structural movements.
5. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
6. Loosening or weakening of fasteners, attachments, and other components.
7. Sealant failure.

D. Structural Loads:

1. Wind Loads, Snow Loads, Earthquake Loads: As indicated by structural design data on Drawings.
2. Concentrated Live Loads: 250 lbf applied to framing members at locations that will produce greatest stress or deflection.
3. Load Combinations: Calculate according to requirements of applicable code indicated on Drawings.

E. Deflection of Framing Members:

1. Deflection Normal to Glazing Plane: Limited to L/120.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.3 PERFORMANCE TESTING

A. Provide metal-framed skylights that comply with test-performance requirements indicated, as evidenced by reports of tests performed on manufacturer's standard assemblies by a qualified independent testing agency.

B. Structural-Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.

C. Air-Infiltration: Metal-framed skylights with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of surface when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa)

D. Water Penetration under Static Pressure Metal-framed skylights that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (718 Pa).

E. Energy Performance: Provide metal-framed skylights with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:

1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.34 Btu/sq. ft. x h x deg F as determined according to NFRC 100.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal-framed skylights.

B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate structural loadings and reactions to be transmitted to supporting curbs.

2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior..

C. Delegated-Design Submittal: For metal-framed skylights indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Fabrication Sample: Of each framing intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for metal-framed skylights.

F. Maintenance Data: For metal-framed skylights to include in maintenance manuals.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of metal-framed skylights required for this Project.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal skylights that are similar to those indicated for this Project in material, design, and extent

C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.

D. Product Options: Information on Drawings and in Specifications establishes requirements for skylights' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.6 PROJECT CONDITIONS

A. Field Measurements: Where metal-framed skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-framed skylights 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 caused by thermal movements.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   d. Adhesive or cohesive sealant failures.
   e. Water leakage.

2. Warranty Period: Five years from date of Substantial Completion.

B. Finish Special Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. "Defects" is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.

1. Warranty Period for Kynar 500 Finish: 10 years from date of Substantial Completion.

C. Glazing Special Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work that has or develops defects in the plastic. "Defects" is defined as abnormal aging or deterioration.

1. Warranty Period for Polycarbonate: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for metal-framed skylights is based on Pinnacle 350 Multiwall Glazing Skylight manufactured by Wasco Division, Velux Commercial. Subject to compliance with requirements, provide the named product or a comparable product by one of the following, or equal:

1. Kawneer
2. Super Sky Products Inc.

2.2 FRAMING MATERIALS

A. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Framing members shall have a minimum effective thickness of 0.109 inches.

B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing, with minimum effective thickness of 0.090 inches.

1. Include snap-on aluminum trim that conceals fasteners.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.

D. Anchors, Fasteners, and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding; compatible with adjacent materials.

1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
2. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.
3. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
4. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.

E. 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.

F. Anchor Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), hot-dip zinc coating, ASTM A 153/A 153M, Class C.

G. Concealed Flashing: Manufacturer's standard, corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

H. Exposed Flashing and Closures: Manufacturer's standard aluminum components not less than 0.032 inch thick for apron flashing and 0.062 inch for closures..

I. Framing Gaskets: Manufacturer's standard.

J. Framing Sealants: As recommended in writing by manufacturer.

1. Sealant shall have a VOC content of 250 g/L or less.

2.3 GLAZING MATERIALS

A. Multiwall Polycarbonate: 25mm multiwall polycarbonate panels as follows:

1. Opal IR (3 wall); VT=24%, SHGC=0.37, U-factor=0.34

B. Spacers, Setting Blocks, and Gaskets: Manufacturer's standard elastomeric types.

C. Glazing Sealants: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer.

1. Sealant shall be capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.
2. Sealant shall comply with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to substrates including other sealants with which it comes in contact, O.
3. Color: Black

D. Flashing Sealant: Type recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer

2.4 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.5 FABRICATION

A. Basis of Design Products: Provide Single Pitch Pinnacle 350 Multiwall Glazing Skylight by Wasco Division, Velux Commercial, or equal in size indicated on Drawings.

B. Fabricate aluminum components before finishing.

C. Fabricate aluminum 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. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

D. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.

E. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.

F. Fabricate aluminum sill closures with weep holes and for installation as continuous component.

G. Reinforce aluminum components as required to receive fastener threads.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Kynar Fluoropolymer Two-Coat System: (70% PVDF) complying with AAMA 2605.

1. Color: Aged Copper.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints between aluminum components 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 joints watertight, unless otherwise indicated.

B. Metal Protection: Where aluminum will contact dissimilar materials, protect against galvanic action by painting contact surfaces with bituminous paint or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.

C. Install continuous aluminum sill closure with weatherproof expansion joints and locked and sealed or welded corners. Locate weep holes at rafters.

D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.

E. Install components plumb and true in alignment with established lines and elevations.

F. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners.

G. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

H. Erection Tolerances: Install metal-framed skylights to comply with the following maximum tolerances:

1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 10 feet but no greater than 1/4 inch over total length.

3.3 CLEANING

A. Clean skylights inside and outside, immediately after installation and after sealants have cured, according to manufacturer's written recommendations.

1. Remove temporary protective coverings and strippable coatings from pre-finished metal surfaces. Remove labels and markings from all components.

B. Remove excess sealant according to sealant manufacturer's written recommendations.

END OF SECTION 086300

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:
   a. Swinging doors

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 08 Section "Hollow Metal Doors and Frames" for factory prefitting and factory premachining of doors and frames for door hardware.

C. Products furnished but not installed under this Section include:

1. Cylinders and cores for locks on access doors.

1.2 SUBMITTALS

A. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

B. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
   a. Type, style, function, size, and finish of each hardware item.
   b. Name and manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
   e. Explanation of all abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for hardware.
   g. Door and frame sizes and materials.
   h. Keying information.

2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

D. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Door and hardware Institute, Architectural Hardware Consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation and who shall review the schedule for overall coordination of hardware.

1. Require supplier to meet with Owner to finalize functions of locking devices, keying requirements and to obtain final instructions in writing.
2. Hardware schedule shall be prepared and sealed by AHC.

C. Regulatory Requirements: Comply with provisions of the following:

1. Comply with Americans with Disabilities Act (ADA), “Accessibility Guidelines for Buildings and Facilities (ADAAG),” and ANSI A117.1-09 , as follows:
   a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
   b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
      2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
   c. Thresholds: Not more than ½ inch (13 mm high). Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors:

   a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
   c. Thresholds: Not more than 1/2 inch (13 mm) high.

D. Fire-Rated Doors and Emergency-Exit Openings: Provide door operators that comply with NFPA 80 requirements for doors as emergency exits and that do not interfere with fire ratings.

E. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

F. Function and Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate function and keying conference decisions into final hardware and keying schedule after reviewing door hardware functions and keying system including, but not limited to, the following:

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. Address for delivery of keys.

1.4 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Upon request, check the Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.6 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of operators and door hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Warranty Period: From date of Substantial Completion, unless otherwise indicated.:

1. Closers: Ten (10) years.
2. Locksets: Three (3) years
3. Exit Devices: Three (3) years
4. All other Hardware: Two (2) years.

1.7 MAINTENANCE AND TRAINING

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products and manufacturers as listed in "Schedule of Acceptable Manufacturers and Products" included at end of this section.

2.2 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:

1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated, or equivalent product approved by the Architect.

2.3 MATERIALS AND FABRICATION

A. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

B. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

C. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

1. Thru-bolting of hardware will only be permitted where required by NFPA 80, door assembly listing requirements, and the door assembly manufacturer’s installation instructions. Fasteners for closer, exit devices and similar hardware that are exposed on opposite face of door from unit will not be permitted.

2.4 HINGES, BUTTS

A. Templates: Provide only template-produced units for hinges at new frames. Provide units to match existing frame mortises where frame is being re-used.

B. Screws: Provide Phillips flat-head screws complying with the following requirements:

1. For metal doors and frames install machine screws into drilled and tapped holes.
2. For fire-rated wood doors install #12 x 1-1/4-inch, threaded-to-the-head steel wood screws.
3. Finish screw heads to match surface of hinges.

C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Out-Swing Corridor Doors: Nonremovable pins.
2. Interior Doors: Nonrising pins.
3. Tips: Flat button and matching plug, finished to match leaves.

2.5 LOCK CYLINDERS, CORES AND KEYING

A. Keying System: Provide keying system to match Owner’s existing system; coordinate with Owner’s requirements.

B. Equip locks with Owner’s standard manufacturer’s cylinders for interchangeable-core 6-pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.

1. Furnish final cores and keys for installation by Owner.

C. Metals: Construct lock cylinder and core parts from brass or bronze, stainless steel, or nickel silver.

D. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

1. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
2. Design master key system allowing for 300 percent expansion.

E. Key Material: Provide keys of nickel silver only.

F. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, and 5 grandmaster keys for each grandmaster system.

1. Deliver keys to Owner.

2.6 LOCKS, LATCHES AND BOLTS

A. Locksets and Latchsets: Provide ANSI A156.2, Series 4000, Grade 2 UL listed, heavy-duty cylindrical type locksets with 2-3/4 inch backset, with a core housing equipped to accept Owner’s standard 6-pin cores, as scheduled.

1. Lever Trim: Match existing.

B. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.

1. Provide flat lip strikes for locks with 3-piece, antifriction latchbolts as recommended by manufacturer.
2. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
3. Provide dust-proof strikes for foot bolts, except where special threshold construction provides nonrecessed strike for bolt.
4. Provide roller type strikes where recommended by manufacturer of the latch and lock units.

C. Lock Throw: Provide 5/8-inch minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

1. Provide 1/2-inch minimum throw of latch for other bored and preassembled types of locks and 3/4-inch minimum throw of latch for mortise locks. Provide 1-inch minimum throw for all dead bolts.

2.7 EXIT DEVICES

A. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

B. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

C. Outside Trim: Lever type of material and finish to match locksets, unless otherwise indicated. Match design for locksets and latchsets.

D. Through Bolts: DO NOT through bolt exit devices and trim on doors. Prepare doors with reinforcing and blocking to receive hardware.

2.8 CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: Except as otherwise specifically indicated, provide non-sized closers for all units.

B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA provisions for door opening force and delayed action closing.

C. Piston: Minimum 1-1/2" diameter one piece steel.

D. Provide all parallel arm closers with one piece forged extra duty arms or 3/8-inch (9 mm) thick stamped solid steel main and one piece forged or 5/16-inch (8 mm) thick stamped solid steel forearm with bronze bushings.

1. Provide spring cushion arms at all exterior doors, and where indicated.
2. Provide standard stop arms at all parallel arm closers scheduled for interior doors where a wall or floor stop is not feasible, and where indicated.
3. Provide only handed closers.
4. Provide only heavy-duty closers recommended by manufacturer for instructional applications. Standard weight products are not acceptable..

E. Provide all regular arm closers with forged or stamped steel mainarm.

F. Provide heavy-duty steel stud shoulder bolts (including main arm and forearm connection) at all regular arm, hold open arm, built-in stop arm, and hold open / built-in stop closers.

G. Provide exterior closers with all weather hydraulic fluid, suitable from 120°F to -35°F without adjustment.

H. Provide closers with powder coat finish on body, arm and plate adapter, or corrosion inhibitor primer and sprayed finish coat.

I. Provide grey resilient parts for exposed bumpers.

2.9 SMOKE SEALS

A. General: Provide continuous smoke seals on doors where indicated or scheduled.

B. Automatic Door Bottoms (Drop Seal): Provide fully mortised type with silicon gasket and clear satin anodize finish on metal portions.

C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled, based on testing according to UL 1784.

D. Fire-Labeled Gasketing: Assemblies complying with NFPA 80-1999 that are listed and labeled, based on testing according to UL 10B or NFPA 252.

2.10 HARDWARE FINISHES

A. Provide satin chrome, BHMA 626 (US26D) finish for all hardware items to greatest extent possible or manufacturer's standard finish matching this finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame supports, and other conditions affecting performance of door hardware.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

1. All doors with lever trim shall have hardware mounted at heights required by ADA (Americans with Disabilities Act) regulations.
2. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified

in the Division 09 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Pre-drill and countersink doors, frames and units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Hand tighten screws and fasteners, use of power driven tools must be limited to preliminary driving screws if permitted by door and hardware manufacturer.

F. Replace doors damaged by improper hardware installation.

G. Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.3 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Adjust door closers in accordance with manufacturer’s instructions for proper door closer adjustment for spring power, backcheck, closing and latching speed.

C. Clean adjacent surfaces soiled by hardware installation.

D. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

E. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.4 HARDWARE SCHEDULE

A. **SCHEDULE OF ACCEPTABLE MANUFACTURERS AND PRODUCTS:** Manufacturers and products are listed in Hardware Sets to establish the general product appearance, type and quality intended for use. Certain items have been specially selected for their appearance and function. Equal products of manufacturers other than those listed below may be acceptable subject to the approval of the Architect. Substitutions proposed for hardware items must be equivalent in every way, as judged solely by Architect.

B. The following list indicates the Owner's standard manufacturers for provision of type of hardware listed, unless equivalent products or manufacturers are specified. Refer to the Hardware Sets for the scheduled products required per door opening.

1. Hinges: Hager BB 1279, full mortise standard weight, BHMA 652 (US26D) finish; 4-1/2" x 4-1/2", 2-ball bearing 5-knuckle; or equivalent by Bommer, McKinney. or Stanley.

2. Locksets/Latchsets: Cylindrical lockset; Assa Abloy, as selected by Owner, with interchangeable/ removable core, BHMA 626 (US26D) finish.

3. Exit Devices: Von Duprin 99 Series, trim as scheduled, with lever trim to match locksets, less cylinders, BHMA 626 (US26D) finish, cylinder dogging feature at non-fire exit devices..

4. Interchangeable Cores: As selected by Owner, for insertion in locksets, exit devices, and elsewhere as scheduled; finish to match lockset. Provide with key and concealed cylinder stamping.

5. Cylinders for use with Interchangeable Core: As selected by Owner. Provide with temporary construction cores, finish to match lockset. Provide Construction cores for all cylinders at exit devices as well

6. Closers: Provide parallel or standard arm closers as indicated in the General Notes below; reduced opening force for handicapped; in aluminum powder painted finish BHMA 689; LCN 4040 Series with full metal covers ("Designer" covers).

7. Silencers: Don-Jo 1608; or equivalent by Ives or Rockwood.

8. Wall Stops: Rockwood No. 406, 407 or 408 as required by wall material, with grey bumper and BHMA 630 finish; or equivalent by Ives

9. Floor Stops: Rockwood No.441 or 443 as required, provide risers 449 as required, with grey bumper and BHMA 630 finish; or equivalent by Ives.

10. Overhead Stops: Rockwood OH 1000 Series stainless steel, of size required, or equivalent by Ives.

11. Smoke Seal: Pemko S-88, or equivalent.

C. SCHEDULED HARDWARE SETS

GENERAL NOTES:

1. Doors hardware shall not prohibit exiting from spaces.
2. Provide hardware finishes specified above unless noted otherwise for a specific set or door.
3. Provide all required installation accessories and options necessary for complete installation of each hardware component, to ensure proper operation of the product.
4. Coordinate all hardware components for each door leaf for overall compatibility.
5. Through-bolting of hardware is not permitted, coordinate all blocking requirements with door manufacturer.
6. Provide all interior doors with wall stops, one per leaf; provide floor type as required when wall stop not feasible. Specific stops scheduled are exceptions to this.
7. Provide thresholds where indicated on drawings.
8. Provide 3 silencers per single door and 2 silencers per pair doors except omit on weatherstripped and smoke and sound sealed doors.
9. Where door closers are scheduled below, provide parallel or standard arm closers placed on the least conspicuous side of the door, unless noted otherwise.
10. Provide cylinders with final cores for access doors as required; coordinate with applicable specification section.
11. Provide specified smoke seal at perimeter for all rated openings on corridor walls and at all smoke control doors where smoke compartments are indicated on drawings. In addition, provide specified smoke astragal seal at all pairs of doors at rated openings on corridor walls as required by door manufacturer to meet smoke sealing requirement .
12. Functions: The lockset/exit device function specified is for BIDDING ONLY. Review all lock and exit device functions with Owner prior to submission of door schedule.
    a. Multi-user Toilet Rooms: Passage lockset
    b. Cross corridor: Panic devices
    c. Office: Entrance Lockset
    d. Storage Room: Storeroom Lockset
    e. Janitor's Closet: Storeroom Lockset
    f. Mechanical Room: Storeroom Lockset
    g. Data Closet: Fail Secure Electric Lock

D. HARDWARE SETS. - See Attached Door Hardware Schedule - Sets

END OF SECTION 087100

HARDWARE SETS

AS: Assembly
- Corridor function lockset
- Single: Rim cylinder exit device
- Wood Paired: Surface mounted vertical rod and astragal w/door coordinator
- Hollow Metal Paired: Concealed vertical rod and astragal w/door coordinator
- Overhead closer on active leafs

CL: Classrooms
- Classroom function lockset w/keyed interior cylinder (Intruder function)
- Overhead closer on active leafs
- Paired: Inactive leaf w/integral astragal and top & bottom flush bolts

CS: Corridor Smoke & Fire Doors (Rated)
- Single: Rim cylinder exit device
- Wood Paired: Surface mounted vertical rod exit device and astragal w/door coordinator
- Hollow Metal Paired: Concealed vertical rod and astragal w/door coordinator
- Electromagnetic hold-open / closer – single point type – auxiliary stop as required
- Cylinder & pull side lever

CSO: Corridor Smoke & Fire Doors Oversized (Rated)
- Hollow Metal Paired: Concealed vertical rod exit device and astragal w/door coordinator
- Electromagnetic hold-open / closer – single point type – auxiliary stop as required
- Continuous Hinges to suit
- Cylinder & pull side lever

EA: Exterior, Aluminum
- Single: Rim cylinder exit device
- Paired: Alum. Removable mullion with Rim cylinder exit device
- Paired: Concealed vertical rod exit device at Main Entrance only
- Overhead closers
- Weather-stripping
- Aluminum saddle
- Architectural door pull each leaf

EH: Exterior, Hollow Metal
- Single: Rim cylinder exit device
- Paired: Keyed removable mullion with Rim cylinder exit device
- Overhead closers
- Weatherstripping & door sweeps
- Pull w/thumb latch each leaf
- Paired: Removable mullion
- Aluminum saddle

KR: Kitchen, Rated
- Passage function lockset and deadbolt
- Overhead closer

KN: Kitchen, Non-Rated
- Push-plate & pull w/cylinder & deadbolt
- Overhead closer

OF: Offices
- Dormitory function lockset
- Coat hook on back (FLNG only)
- Overhead closers at rated doors

SE: Secure (Storage/Janitor/Mech/etc.)
- Storeroom function lockset
- Overhead closers at rated doors
- Paired: Inactive leaf w/integral astragal, coordinator, top & bottom flush bolts and overhead closer

TM: Toilet, Multi-User
- Passage function lockset
- Deadbolt w/anti-locking thumb turn
- Overhead closer

TS: Toilet, Single-User
- Guestroom function lockset w/occupancy indicator
- Coat hook on back
- Overhead closer

Hardware Notes:

1. Provide “Fire Bolt” hardware (w/suitable UL listing & fire rating) for doors within fire walls & smoke barriers. (no-dogging permitted)
2. Hardware within fire walls shall be rated for the fire rating of that wall.
3. Hollow metal frames within fire walls shall be rated for the fire rating of that wall.
4. All glazing added in the new or existing gyms shall be safety glazing in addition to fire ratings denoted.
5. All hardware shall be stainless steel US32D.
6. All exterior hardware shall be stainless steel US32D.
7. Provide continuous hinges at all exterior doors and as noted elsewhere. All other doors to receive 1½ pr. H.D. Butt hinges per leaf unless noted otherwise.
8. Provide integral hold-open feature on overhead closers at main entry doors & associated vestibule doors. Also as noted in door schedule & where adjacent wall(s) cannot provide 90° wall type magnetic hold open.
9. Provide kick plate on push side of all doors except aluminum doors. Provide mop plates on pull side of all doors except at carpeted areas.
10. Provide 3 silencers on all strike jambs.
11. Provide appropriate wall, or overhead stop for each door location. Floor stops are not to be used unless specifically approved by the architect, on a case by case basis.
12. Provide panic device glass bead shim kit where required
13. See plans for hardware swing extent and provide hardware accordingly.
14. Size hinges and closers to match door size and weight.
15. Keying system as directed by owner.
16. Provide ‘safety’ fire rated glass in rated doors/frames. Provide tempered glass for all other doors/frames requiring safety glazing. At minimum, safety glazing is required for all locations where glazing is 18” or less above finished floor and for all glazing that is in a corridor that is 48” or less above finished floor. See door schedule for ratings, safety & heat transfer info.
17. Smoke /Fire doors are to have Smoke Fire Gaskets.
18. At smoke & fire doors with magnetic hold-open feature that do not have a wall adjacent for mounting hold-open, provide integrated type within frame. G.C. to coordinate this with E.C. for inclusion of wiring.
19. Dust proof strike w/ all vertical rod exit devices
20. See door schedule for specific exceptions to hardware sets
21. See door schedule for door saddle requirements & details
22. See door schedule “Notes column” for door undercut info – eg: U1 denotes 1” undercut of door in addition to saddle requirements.

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes the Following:

1. Fixed, extruded-aluminum louvers.

B. Related Sections Include the Following:

1. Division 07 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
2. Division 23 Sections for louvers that are a part of mechanical equipment.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.

1. Wind Loads: Uniform pressure (velocity pressure) of 18 lbf per sq. ft. acting inwards.

B. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by

testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

C. Samples for Verification: For each type of metal finish required.

D. Product Certificates: Signed by manufacturers stating the location of the material manufacturer and the distance from the manufacturer to the Project site.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Product: The design for each louver is based on the product named. Subject to compliance with requirements, provide either the named product or approved equivalent by one of the other manufacturers specified.
   a. Construction Specialties.
   b. Airolite Co.
   c. Reliable Metal Products.
   d. Industrial Acoustics Company.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.T-52.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.

D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit installation conditions.
2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.

E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing to produce uniform appearance.

C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Where indicated, provide subsills made of same material as louvers or extended sills for recessed louvers.

F. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Single Drainable-Blade Louver:

1. Basis-of-Design Product: Ruskin Model ELF375DX Drainable Stationary Louvers.
2. Finish: Fluoropolymer 3-Coat System.
3. Depth: 4-inches.
4. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.081 inch.

5. Mullion Type: Fixed, hidden mullions shall allow for continuous line appearance for up to 120"
6. Performance Requirements:
   a. Free Area: 54%.
   b. Point of Beginning Water Penetration: 873 fpm at .01 oz/sf.
7. Sizes: Refer to Contract Drawings for sizes, configurations, and locations.
8. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening. NO Insect screening allowed.

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Same finish as louver frames to which louver screens are attached.

D. Louver Screening for Aluminum Louvers:

1. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 BLANK-OFF PANELS

A. Insulated, Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.

1. Thickness: 1 inch (25 mm).
2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.81-mm) nominal thickness.
3. Insulating Core: Rigid, glass-fiber-board insulation.
4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard channel frames, with corners mitered and with same finish as panels.
5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
6. Panel Finish: As selected by Architect.
7. Attach blank-off panels with clips.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish louvers after assembly.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

B. High-Performance Organic 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 manufacturers' written instructions.

1. Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
   a. Color(s): As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed surfaces of louvers that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089000

SECTION 092150 - GYPSUM PLASTER REPAIR AND RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Repair of existing plaster on interior walls and ceilings to the extent indicated on drawings.
2. Repair of existing plaster on interior walls and ceilings that requires cutting or removal to accommodate new conduit, piping, or other components of mechanical and electrical systems or other new construction.

1.2 SUBMITTALS

A. Product Data consisting of manufacturer's product specifications and installation instructions for each product, including data showing compliance with specified requirements.

B. Samples for verification in units at least 12 inches (300 mm) square of each type of finish indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

C. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.

1.3 QUALITY ASSURANCE

A. Installer: A firm having not less than five (5) years successful experience in plaster work similar to work of this project.

B. Workmen: Skilled plasterers who have demonstrated experience in the type of work specified and who are thoroughly familiar with the requirements of the work. In acceptance or rejection of plaster work, no allowance will be made for lack of skill on the part of the workmen.

C. Single-Source Responsibility: Obtain gypsum plaster from one source and by a single manufacturer.

D. Fire-Test-Response Characteristics: Where fire-resistance-rated plaster assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance

Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

E. Mockups: Prior to proceeding with plaster repair and restoration work, prepare mock-up panels for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Provide in-place 2' x 2' (min. size) sample of each type of repair work at existing plaster wall or ceiling surfaces to demonstrate quality of work expected in finished work in location directed by Architect.
2. Execute mock-up in presence of Architect using all materials indicated for final Work including lath, support system, and control joints.
3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before proceeding with remainder of plaster repair and restoration work.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed plasterwork.
7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original packages, containers, or bundles, labeled with manufacturer's name, product brand name, and lot number.

B. Store materials inside, under cover, and dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes. Protect plaster material from dampness and intrusion of foreign material.

1.5 PROJECT CONDITIONS

A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.

B. Temperature Requirements: Maintain continuous uniform room temperature of not less than 40 deg F (4 deg C) nor more than 80 deg F (27 deg C) for at least 7 days before beginning plaster application, during its application, and until plaster is dry but for at least 7 days after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting plaster near heat source.

C. Ventilation Requirements: Ventilate building spaces as required to remove water in excess of that required for hydrating plaster. Begin ventilation immediately after plaster is applied and continue until it sets.

D. Protect contiguous work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

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. Gypsum Plasters and Accessories:
   a. National Gypsum Co.
   b. United States Gypsum Co.

2.2 LATH

A. Expanded-Metal Lath: Fabricate expanded-metal lath from uncoated or zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847 for type, configuration, and other characteristics indicated below, with uncoated steel sheet coated after fabrication into lath.

1. Diamond-Mesh Lath: Weighing 3.4 lb/sq. yd. (1.8 kg/sq. m).
   a. Provide self-furring type for plastering directly on masonry, concrete, plywood and other flat surfaces.
   b. Provide rib lath for ceiling locations.
   c. Provide expanded metal flat diamond mesh lath for all other locations.

2.3 ACCESSORIES

A. General: Comply with material provisions of ASTM C 841 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required.

1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 (ASTM A 653M, Z90) minimum coating designation.

B. Metal Cornerbeads: Type as indicated below, fabricated from zinc-coated (galvanized) steel.

1. Type: Small nose with perforated flanges, for use on curved corners.
2. Type: Small nose with expanded flanges reinforced by perforated stiffening rib, for use on columns and for finishing masonry corners.
3. Type: Bull nose, radius 3/4 inch (19 mm) minimum, with expanded flanges, at locations indicated.

C. Strip Reinforcement: Smooth-edge strips of expanded-metal lath fabricated from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet coated after fabrication; in the following forms:

1. Cornerite: Strips bent lengthwise in center for internal plaster angles not otherwise reinforced by metal lath lapped or carried around.
2. Stripite: Flat strips for reinforcing joints in gypsum lath, nonmetallic bases, and between dissimilar plaster bases.

D. Casing Beads: Square-edged style, with short or expanded flanges to suit kinds of plaster bases indicated; of the following material:

1. Material: Zinc-coated (galvanized) steel.

E. Control Joints: Prefabricated, zinc-coated (galvanized) steel; one-piece type with folded pair of nonperforated screeds in M-shaped configuration, with expanded or perforated flanges.

1. Provide removable protective tape on plaster face of control joints.

2.4 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Bonding Compound: ASTM C 631.

C. Repair and Reinforcing Tape: Open-mesh, glass fiber.

2.5 PLASTER MATERIALS

A. Base-Coat Plasters: ASTM C 28, types as indicated below:

1. High-strength gypsum neat plaster with a minimum, average, dry compressive strength of 2800 psi (19 MPa) per ASTM C 472 for a mix of 100 lb (45 kg) of plaster and 2 cu. ft. (0.06 cu. m) of sand.

B. Finish-Coat Plasters: Gypsum Keene's cement, ASTM C 61.

C. Finishing Hydrated Limes: ASTM C 206, type S, special hydrated lime for finishing purposes.

D. Aggregates for Base-Coat Plasters: ASTM C 35, type as indicated below:

1. Sand aggregate, unless otherwise indicated.

E. Aggregates for Finish-Coat Plaster with Floated Finish: ASTM C 35, sand aggregate. graded per ASTM C 842.

F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. High-Strength Gypsum Neat Plaster:
   a. Structo-Base; United States Gypsum Co.

2. Gypsum Keene's Cement:
   a. Red Top Keene's Cement; United States Gypsum Co.

3. Finishing Hydrated Limes, Type S:
   a. Ivory Finish Lime; United States Gypsum Co.
   b. Snowdrift Finish Lime; United States Gypsum Co.

2.6 PLASTER MIXES AND COMPOSITIONS

A. Plaster Base-Coat Compositions: Comply with ASTM C 842 and manufacturer's written instructions for plaster base-coat proportions that correspond to application methods and plaster bases indicated below:

1. Three-Coat Work over Masonry and Metal Lath: Base coats as indicated below:
   a. Scratch Coat: High-strength gypsum plaster with job-mixed sand.
   b. Brown Coat: High-strength gypsum plaster with job-mixed sand.

B. Finish Coats: Proportion materials in parts by dry weight for finish coats to comply with the following requirements for each type of finish coat and texture indicated:

1. Troweled Finishes: Finish-coat proportion as indicated below:
   a. Gypsum Keene's Cement: 2 parts plaster to 1 part lime.

2.7 MIXING

A. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

B. Use materials without admixture of materials other than those specified herein in each instance. No retempering or retarding of partially set plaster mixes will be permitted, trade custom or local practices notwithstanding.

C. Mix plaster in a batch type mixer at the construction site. Frozen, caked or lumpy material shall not be used. Clean mixer of all set or hardened material before materials for a new batch are loaded.

D. Mix each batch of plaster separately. Thoroughly mix to obtain uniformity of color and workable consistency of mass and only in such quantities as will be used before it has started to set. Retempering after the plaster has started to set will not be permitted and such plaster shall be discarded.

E. Machine mix special finishing hydrated lime with amount of water called for in printed directions of the manufacturer to form a putty and allow to stand for at least 15 minutes

before using. Treat hydrated lime in a manner to obtain smooth or lump-free putty. Protect the putty from sun and take preventive measures to prevent excessive evaporation while stored.

F. Batches for base coats shall not be in excess of an amount that can be entirely used within two hours. Batches for finish coats shall not be in excess of an amount that can be entirely used within 30 minutes.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine surfaces to which the work is to be attached or applied and notify Architect of existing conditions that are detrimental to the proper and expeditious installation of the work. Starting of work shall imply acceptance of surfaces to perform work as specified.

3.2 PROTECTION

A. Exercise care to avoid soiling or spattering plaster onto the work of other trades. Use cover cloths or other suitable means of protection.

B. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when plaster repair work is performed in areas from which such items have not been removed.

C. Take precautions to prevent unnecessary staining and smearing of floors by covering the floors with polyethylene.

3.3 PLASTER REMOVAL:

A. Remove deteriorated plaster and corroded metal lath in areas indicated on drawings. Carefully remove all existing plaster that is loose, friable, bubbled, crumbling or otherwise deteriorated or unsuitable to remain. Make clean, sharp edges beveled inward to insure firm bond of new plaster.

3.4 INSTALLATION OF LATH AND FURRING, GENERAL

A. Interior Lathing and Furring: Install materials indicated for plaster to comply with ASTM C 841.

B. Isolation: Where lathing and metal support system abuts building structure horizontally and where partition or wall abuts overhead structure, sufficiently isolate from structural movement to prevent transfer of loading from building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.

1. Frame both sides of control joints independently and do not bridge joints with furring and lathing or accessories.

3.5 METAL LATHING

A. Install expanded-metal lath for applications where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced lathing installation standards.

3.6 INSTALLATION OF PLASTERING ACCESSORIES

A. General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering.

B. Accessories: Provide the following types to comply with requirements indicated for location:

1. Cornerbeads: Install at external corners.
2. Casing Beads: Install at terminations of plaster work, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.
3. Control Joints: Install at locations indicated or, if not indicated, at spacings and locations required by referenced standard, recommended by plaster manufacturer, and approved by Architect. Spacing between joints in either direction shall not exceed the following:
   a. Partitions: 30 feet (9 m).

3.7 PLASTER APPLICATION, GENERAL

A. Prepare monolithic surfaces for bonded base coats and use bonding compound to comply with requirements of referenced plaster application standards for conditioning monolithic surfaces.

B. Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet (3 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a 10-foot (3-m) straightedge placed at any location on surface.

C. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches (152 mm) at each jamb anchor.

D. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other.

E. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal frame by casing beads, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.

F. Apply thicknesses and number of coats of plaster as indicated or as required by referenced standards.

G. Concealed Plaster: Where plaster application will be concealed by wood paneling, above suspended ceilings and in similar locations, finish coat may be omitted; where concealed behind cabinets, similar furnishings, and equipment, apply finish coat; where used as a base for adhesive application of tile and similar finishes, omit finish coat, coordinate thickness with overall dimension as shown, and comply with tolerances specified.

3.8 PLASTER APPLICATION

A. Plaster Application Standard: Apply plaster materials, composition, mixes, and finishes indicated to comply with ASTM C 842.

B. Execute work to provide a finish free from depressions, bulges, slick spots, scratches, brush and tool marks, cracks, visible joints, crazing, and discolorations. Surfaces shall have true planes, with uniform texture to match the adjoining surfaces and with lines and arises that are straight, plumb and level. Work shall be true to grounds and guidelines and free from blemishes and defects of any sort.

1. Ventilation: During the application of each coat of interior plaster, keep the exterior openings closed until the plaster has set, then adjust for proper ventilation to regulate the drying and curing of the plaster.
2. Thickness of Plaster: Match original thickness where patching.
    a. Where plastering over existing walls in which existing surface is uneven and bumpy, adjust plaster thickness as much as possible to compensate for existing surface irregularities.

3. Joints: Lap joints in succeeding coats including joints at interior angles; continue past the angle and corner and feather off on adjacent wall.

C. Scratch (First) Coat:

1. Apply plaster with sufficient materials and pressure to force plaster to form good bond with solid base material and cover well.
2. Leave surface level.
3. Scratch this coat and allow to set and thoroughly dry out before the application of the brown coat.

D. Brown (Second) Coat:

1. Do not apply brown coat until after scratch coat has hardened, not sooner than 48 hours after application of scratch coat. Evenly dampen scratch coat to provide uniform suction before brown coat is applied.
2. Prior to application of gypsum brown coat place plaster screeds at angles and corners and at intervals of 8' in both walls and ceilings unless grounds occur at smaller intervals.
3. Thickness of Brown Coat: Approximately 3/8". Bring brown coat out to ground and required lines, to true, even surfaces. Straighten with rod and darby and leave rough to accept finish coat.
4. Moist cure brown coat for 48 hours after application and then allow coat to set and dry out.

E. Finish Coat:

1. Thickness of Finish: 1/16 to 1/8 inch thick and treated and finished as directed.
2. Before application of finish coat, cut out shrinkage cracks and fill with scratch coat mortar.
3. Apply finish coats well ground to scratched surfaces, then double back and trowel down to a true plane, filling all imperfections. Delay troweling as long as possible and used only to eliminate uneven points and to force aggregate particles into the plaster surface. Avoid excessive troweling.
   a. For smooth coat finish, trowel surface to a smooth, highly polished surface.

4. Finish surfaces plumb, straight, level, and true throughout, varying from a true plane by not more than 1/8" when tested with a 10' straightedge at any point and finish surface to match adjacent existing texture.

F. Washdown: When plaster work has been completed, wash down the new plaster with a zinc sulphate solution (2 pounds per gallon of water) and allow to dry.

3.9 CUTTING AND PATCHING

A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

B. Leave plaster ready for painting.

3.10 PATCHING AND REPAIRS TO EXISTING PLASTER

A. General: Provide patching and repairs to existing plasterwork that is damaged or deteriorated or has been disturbed to accommodate installation of new mechanical or electrical equipment or other construction. Make all such repairs and prepare all surfaces as required to obtain a complete and first class job, as required by job conditions. Comply with plaster manufacturer's recommendations for preparation of surfaces, including installation of lath.

B. Preparation: Scrape and sand existing plaster surfaces to be repaired, removing all loose and peeling paint.

C. Bonding Compound on Existing Plaster Surfaces: Apply bonding agent to existing plaster to receive new repair material and allow to dry until no longer tacky before proceeding.

D. Apply plaster, filling repaired areas in accordance with general plastering provisions described herein. Repair cracks, spalls, gaps and holes, restoring surfaces to a smooth, true, and flush condition.

E. Reinforce interior angles and flat joints with joint tape and embedding material to comply with ASTM C 843 and manufacturer's written recommendations.

F. Bumps and Wavy Surfaces: Thoroughly sand bumps and waves as much as possible and apply skim coats of plaster compound filling all depressions to obtain a smooth and true surface. Contractor may use spackling compound that is compatible for use over plaster if approved in advance by the Architect.

G. Fill hairline cracks with plaster flush and smooth. All other cracks shall have a channel cut along full length of crack of sufficient width to attain tight bond and to receive new plaster. Reverse cut side walls of channel to insure proper bonding of new plaster. Fill channel with successive coats specified herein bringing finish coat out flush for invisible appearance.

H. Skim coat plaster where base is sound but surface is cracked or crazed or surface was not originally an acceptable finish coat or where for other reasons surface is not hard, smooth, acceptable finish for scheduled surface treatment.

I. Do not apply plaster coat over any existing painted surfaces.

J. Execute pointing around fixtures, outlet boxes, switches, plates, piping, registers, and all other elements abutting or extending through plaster.

K. Repaired and patched areas shall match adjoining work in texture and finish.

3.11 CLEANING AND PROTECTING

A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering. When plastering is completed, remove unused materials, containers, and equipment and clean floors of plaster debris.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure plaster work is without damage or deterioration at the time of Substantial Completion.

3.12 CURING

A. Allow plaster to cure 30 days prior to application of paint or other finishes.

END OF SECTION 092150

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 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.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DESCRIPTION

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), hot-dip galvanized, unless otherwise indicated.

B. Studs and Runners: ASTM C 645. EQ studs not permitted.

1. Steel Studs and Runners:
   a. Minimum Base-Metal Thickness: 0.0296 inch, 30 mils.
   b. Depth: As scheduled on Drawings for each location.

C. Slip-Type Head Joints: 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 cold rolled channel bridging

attached to each stud 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:
        1) ClarkDietrich; MaxTrak Slotted Deflection Track
        2) Steel Network Inc. (The); VertiClip SLD Series.
        3) Telling Industries; True-Action™ Slotted Track.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.033 inch, 33 mil.

E. Cold-Rolled Channel Bridging and Bracing: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 1-1/2 inches (38 mm) unless otherwise indicated.
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.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
2. Depth: 7/8 inch (22.2 mm) unless otherwise indicated.

G. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical.

H. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 3/4 inch (19 mm) unless otherwise indicated.
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.

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.
   a. Type: Postinstalled, chemical anchor or postinstalled, expansion anchor.

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.

1. Depth: 1-1/2 inches (38 mm) unless otherwise indicated on Drawings.

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.
   a. Minimum Base-Metal Thickness: 0.018 inch, 18 mil.
   b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
   a. Minimum Base-Metal Thickness: 0.018 inch, 18 mil.

4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical or hat shaped.

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, except comply with framing sizes and spacing indicated.

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.

E. Cutting, Notching and Boring Holes in Nonstructural Steel Wall Framing:

1. Flanges and lips of nonstructural steel wall studs shall not be cut or notched.
2. Holes in webs of nonstructural steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed 1-1/2 inches (38 mm) in width or 4 inches (102 mm) in length, and the holes shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs at 16 inches (406 mm) o.c. unless otherwise indicated.

C. 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.

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.

D. Install steel studs used as furring with clip angles at midpoint of wall span. Install additional clips to limit deflection to L/240 for walls finished with gypsum wall board and L/360 for walls finished with tile or plaster when subject to 5 psf (239 Pa) lateral load.

E. Direct Furring: 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. 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 in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

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. 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.

F. 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.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Sound-attenuation blankets

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.3 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.
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.

1.4 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.

1.5 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.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - 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 one of the following:
   1. CertainTeed Corp.
   2. Georgia-Pacific Gypsum LLC.
   3. Lafarge North America Inc.
   4. National Gypsum Company.
   5. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Where drawings indicate regular type 5/8 inch (15.9 mm), provide 5/8 inch (15.9 mm) Type X indicated below.
   3. 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. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces, in 5/8 inch thickness unless otherwise indicated, with tapered edges; panels shall be classified as Type X

1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
2. Products: Subject to compliance with requirements, provide one of the following or equal:
   a. National Gypsum Company; Type XP/PR
   b. United States Gypsum Co.; Mold Tough

E. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M.
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.
4. Performance Data:
   a. Surface Abrasion: ASTM C1629. Classification Level 2
   b. Surface Indentation: ASTM C1629. Classification Level 1
   c. Soft-body Impact Test: ASTM C1629. Classification Level 1
5. Products: Subject to compliance with requirements, provide one of the following or equal:
   a. Protecta AR 100 Type X with Mold Defense; Lafarge North America Inc.
   b. ProRoc Gypsum Board Panels; Certainteed, Division of BPB.

F. 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).
   a. Long Edges: Tapered

2.4 SPECIALTY GYPSUM BOARD

A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
1. Products: Subject to compliance with requirements, provide one of the following or equal:
   a. CertainTeed Corp.; ProRoc Type C.
   b. Lafarge North America Inc.; Firecheck Type C.
   c. National Gypsum Company; Gold Bond Fire-Shield C.
   d. USG Corporation; Firecode C Core.
2. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
3. Long Edges: Tapered.
4. Provide where required by UL Design or NER 258.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
1. Material: Galvanized-coated steel sheet or rolled zinc
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. Expansion (control) joint.
f. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Fry Reglet Corp.
b. Gordon, Inc.
c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish:
a. Curved Drywall Trim: Corrosion-resistant primer compatible with joint compound and finish materials specified.

4. Basis of Design Products:
a. Curved Drywall Trim: Provide Contura curved drywall trim by Gordon Inc. for locations indicated on the Drawings, in sizes required.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
1. Interior Gypsum Board: Paper.

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, 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 factory mixed drying-type, all-purpose compound.
a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use factory mixed drying-type, all-purpose 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.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. 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.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. 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).

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: Provide mineral-fiber SAFB where required by the UL assembly.

E. Acoustical Joint Sealant: As specified in Section 079200 “Joint Sealants”

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.

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.
   1. Refer to Section 079200 for additional requirements.

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. Type X: Vertical surfaces unless otherwise indicated.
   2. Abuse-Resistant Type: As indicated on Drawings.
   3. Moisture- and Mold-Resistant Type: As indicated on Drawings.
   4. Type C: Where required for specific fire-resistance-rated assembly indicated.
   5. Flexible Type: Apply in double layer at curved assemblies.

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 vertically (parallel 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. 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. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

A. 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.

B. 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 according to ASTM C 840 and in specific locations approved by Architect for visual effect.

1. Install control joints on 30 foot maximum centers, for all partitions, at locations indicated, and as detailed. Align control joints with door frames wherever possible, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
2. Install control joints at 50 foot maximum centers, with areas not to exceed 2,500 sq. ft. for all ceiling areas, at locations indicated, and as detailed.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use where indicated.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.

5. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings.

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:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 4: At all panel surfaces that will be exposed to view unless otherwise indicated.
4. Level 5: Provide Level 5 finish at all areas where wall washed lighting is indicated and at surfaces scheduled to receive gloss paint, and elsewhere specifically indicated on Drawings and schedules.

3.6 IDENTIFICATION

A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
1. Be located in accessible concealed floor, floor-ceiling or attic spaces.
2. Be repeated at intervals not exceeding 30 feet (914 mm) measured horizontally along the wall or partition.
3. Include lettering not less than 0.5 inch (12.7 mm)) in height, incorporating the followings wording: “FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS,” or other wording to reflect the wall type as indicated on the Code Summary Drawings.

3.7 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.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

B. Related Sections include the following:

1. Acoustical sealants are specified in Division 07 Section “Joint Sealants”

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product specified

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension members.
2. Method of attaching hangers to building structure.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
4. Minimum Drawing Scale: 1:100

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on samples of size indicated below.

1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

B. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

C. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer..

C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
   a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency .
   b. Identify materials with appropriate markings of applicable testing and inspecting agency.

2. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
   a. Smoke-Developed Index: 450 or less

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components 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 panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges, soiling panels or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel 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.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Components: 2% of each type of panel installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Products: Subject to compliance with requirements, provide specified products by Armstrong World Industries or equivalent products.

2.2 ACOUSTICAL PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels 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 Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
2. Provide fire-resistance rated panels where indicated.

B. Acoustical Panels for Acoustical Panel Ceiling ACT: Where this designation is indicated, provide acoustical panels complying with the following:

1. Classification: Panels fitting ASTM E 1264 for Type XII, fiberglass with membrane-faced overlay; Form 2, water felted.
2. Pattern: Panels fitting ASTM E 1264 pattern designation (description) E (lightly textured).
3. Color: White.
4. Light Reflectance Coefficient: Not less than LR 0.88.
5. Noise Reduction Coefficient: 0.95
6. Ceiling Attenuation Class: N/A
7. AC: 190
8. Fire Rating: Class A
9. Sag Resistance Treatment: Armstrong HumiGuard Plus
10. Anti-Mold and Mildew Treatment: Inherent
11. Warranty: 30 year
12. Edge Detail: Square tegular.
13. Thickness: 1 inch.
14. Size: 24 by 24 inches.
15. Basis of Design Product: Armstrong Optima Tegular #3250.

2.3 METAL SUSPENSION SYSTEMS

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

1. Provide fire-resistance rated metal suspension system where indicated

B. Suspension System for Acoustical Panel Ceilings ACT: Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z120) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
3. Face Design: Flush face.
4. Cap Material: Steel sheet.
5. Cap Finish: Manufacturer's standard factory-applied painted finish in white.
6. Basis of Design Product: Armstrong Prelude XL.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

1. 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 hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

D. 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, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

E. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish and color as that used for exposed flanges of suspension system runners.

F. Hold-Down Clips: Where indicated or required for fire-rating, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.

2.4 ACOUSTICAL SEALANT

A. Refer to Division 07 Section “Joint Sealants”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
2. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

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. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
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; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not attach hangers to steel deck tabs.

6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

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 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.
2. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint and stain systems on the following interior substrates:

1. Concrete
2. Steel and iron.
3. Galvanized metal.
4. Gypsum board
5. Plaster.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches (200 mm) 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.

1.3 QUALITY ASSURANCE

A. MPI Standards: Maintain copy of this standard at the Project site at all times.

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples 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. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
   b. Other Items: Architect will designate items or areas required.

2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.
   a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 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.

1.5 PROJECT 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.

C. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. PPG Architectural Finishes, Inc.
3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)and the OTC (Ozone Transport Commission) restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
4. Floor Coatings: VOC not more than 100 g/L.
5. Shellacs, Clear: VOC not more than 730 g/L.
6. Shellacs, Pigmented: VOC not more than 550 g/L.
7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
10. Floor Coatings: VOC not more than 100 g/L.
11. Shellacs, Clear: VOC not more than 730 g/L.
12. Shellacs, Pigmented: VOC not more than 550 g/L.
13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
14. Dry-Fog Coatings: VOC content of not more than 400 g/L.
15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.
17. Fire Retardant Paint: VOC content of not more than 60 g/L.

C. Colors: 10 colors plus black and white, at each school. Colors scheduled are for color matching only.

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 work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Gypsum Board and Plaster: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that 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.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers 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 and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

F. 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.

G. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

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.

B. Application Procedures: Apply paints and coatings by brush or roller according to the manufacturer's directions, except s noted below. Spray application is not permitted for trim, ceilings and walls, unless specifically approved by Architect in advance for each individual situation. Roller application on woodwork is not permitted.

1. 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.
2. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
3. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

C. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

D. 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.

E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

F. 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.

G. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical Work:
   a. Uninsulated metal piping.
   b. Uninsulated plastic piping.
   c. Pipe hangers and supports.
   d. Tanks that do not have factory-applied final finishes.
   e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
   f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

2. Electrical Work:

a. Switchgear.
b. Panelboards.
c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints 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.

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 EXTERIOR PAINTING SCHEDULE

A. General: Provide listed products or equal products of other named manufacturers in Part 2.

B. Ferrous Metal (Steel and Iron): Polyurethane, Pigmented, Epoxy Zinc Rich Primer and High-Build Epoxy Coating System: Gloss or Semi-Gloss as selected by the Architect.

1. Prime Coat: Epoxy Zinc Rich Primer. Tnemec: Tneme-Zinc Series 90-97 or equal.
2. Intermediate Coat: High-performance, polyamidoamine -epoxy coating: Tnemec: Hi-Build Epoxoline II, Series L69F, tinted slightly lighter than top coat.

3. Topcoat (Gloss): Aliphatic Acrylic Polyurethane, Two-Component, Pigmented, Gloss: Tnemec Endura-Shield Series 1094.
4. Topcoat (Semi-Gloss): Aliphatic Acrylic Polyurethane, Two-Component, Pigmented, Semi-Gloss: Tnemec Endura-Shield Series 1095.

C. Zinc-Coated (Galvanized) Metal: Full-gloss, acrylic latex enamel finish - 2 coats - self-priming.

1. Prime Coat: Gloss acrylic latex enamel paint; MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
   a. Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28

2. Top Coat: Gloss acrylic latex enamel paint; MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
   a. Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28

3.7 INTERIOR PAINTING SCHEDULE

A. General: Provide listed products or equal products of other named manufacturers in Part 2.

B. Gypsum Board and Plaster Ceilings: Eggshell acrylic finish.

1. Prime Coat: Latex-based, interior primer; MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
   a. Benjamin Moore; Ultra Spec 500 Interior Latex Primer N534

2. Intermediate Coat and Topcoat: Low-luster (eggshell or satin), acrylic-latex, interior enamel; MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009 LEED V4, CHPS Certified.
   a. Benjamin Moore; Ultra Spec 500 Interior Latex Eggshell T538.

C. Gypsum Drywall and Plaster Walls: Semi-gloss, acrylic finish.

1. Prime Coat: Latex-based, interior primer; MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
   a. Benjamin Moore; Ultra Spec 500 Interior Latex Primer N534

2. Intermediate Coat and Topcoat: Semigloss acrylic-latex, interior enamel; MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.
   a. Benjamin Moore; Ultra Spec 500 Latex Semigloss T539.

D. Gypsum Drywall Walls at Bathrooms and Janitor's Closets (and where scheduled): Semi-Gloss, waterborne acrylic epoxy finish.

1. Prime Coat: Latex or two component epoxy-based, interior primer; MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
   a. Benjamin Moore; Fresh Start Multi-Purpose Primer N023.

2. Intermediate Coat and Topcoat: Two component semi-gloss acrylic-epoxy;Interior/Exterior Epoxy (water based), LEED 2009.
   a. Benjamin Moore; Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.

E. Hollow Metal Doors, Frames, and Sidelights, and Ferrous Metals: Semigloss, acrylic-enamel finish.

1. Prime Coat: Rust-Inhibitive Primer (Water Based), MPI #107, X-Green 107, 134, LEED 2009, CHPS Certified.
   a. Benjamin Moore; Super Spec HP Acrylic Metal Primer P04.

2. Intermediate Coat and Topcoat: Factory-formulated semigloss acrylic-latex enamel for interior application; MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
   a. Benjamin Moore; Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29

F. Concrete Floors: Semigloss, waterborne epoxy Polyamide self-priming finish - VOC Range <250; with slip resistant additive.

1. Intermediate Coat and Topcoat: Benjamin Moore; I.M.C. Acrylic Epoxy Gloss #M43/M44. Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
2. Additive: H&C Sharkgrip Slip Resistant Additive, or equal.

END OF SECTION 099100

SECTION 230100 - GENERAL CONDITIONS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GENERAL CONDITIONS

A. Before submitting a proposal, Bidders shall examine all related to this work and shall become fully informed as to the extent and character of the work required and its relation to the other work in the building.

B. Before commencing work, the Contractor will examine all conditions of the project upon which his work is in any way dependent for perfect workmanship according to the intent of this Specification. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed by this Contractor and acceded to by the Owner's representative in writing before the Contractor begins any part of the work.

C. The Contractor will pay for all licenses, permits and inspection fees required by civil authorities having jurisdiction. Comply with all laws, ordinances, regulations, and fire underwriter’s requirements applicable to work herein specified without additional expense to the Owner.

D. Small scale drilling through walls and floors or cutting of piping insulation which may contain asbestos shall be performed by a person with a “restricted asbestos handler allied trades certificate” and shall have a copy of it in his possession at all times while working of the project. This shall also apply to removal of piping, ductwork or equipment insulation.

E. It is specifically intended that anything (whether material or labor), which is usually furnished as a part of such equipment, as is hereinafter called for (and which is necessary for the completion and proper operation) shall be furnished as part of this Contract without additional cost the Owner, whether or not shown in detail or described in the Specifications.

F. When Drawings and Specifications conflict or there is a question as to the proper intent of this Contract, the Contractor shall assume the greater quantity, the higher quality and/or the more expensive method in his pricing. All questions shall be directed to the Architect/Engineer in writing only and only up to ten (10) days prior to bidding.

G. The Drawings indicate the general runs of the piping, ductwork, etc. systems and the location of equipment and apparatus, however it shall be understood that the right is reserved by the Architect/Engineer to change the location of piping work, ductwork, equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.

H. All components supplied by this Contractor shall be UL listed and/or ETL labeled and shall conform to ASHRAE Standard 15.

I. Any changes from the Drawings and Specifications and any interpretation thereof shall have the prior approval of the Architect/Engineer. The Contractor shall submit in writing, at the time of signing the Contract, any items of necessary labor and materials, which, in his opinion, are lacking in requirements of the Drawings and Specifications to insure a complete job in all respects. No consideration will be granted to alleged misunderstanding of materials to be furnished, work to be done, or conditions to be complied with, it being understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying Drawings.

END OF SECTION 230100

SECTION 230110 - SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SCOPE OF WORK

A. The work under this section includes all labor, materials, equipment, tools, transportation, and the performance of all work necessary and required for the furnishing and installation complete of all work as shown on the Contract Documents, including but not necessarily limited to the following:

1. Exhaust, supply fans and related appurtenances.

2. Rooftop HVAC units and related appurtenances.

3. Roof mounted VRF and associated indoor units.

4. Air handling units and related appurtenances.

5. All required piping, valves and related specialties.

6. Variable frequency drives.

7. Sheetmetal ductwork and related accessories.

8. Duct and pipe insulation.

9. Registers, diffusers, and dampers.

10. Rigging of equipment.

11. Furnish all combination motor starter/disconnects for equipment (with the exception of starters and electric items already mounted on equipment or equipment not requiring same). Fan motor starter/disconnects shall have contacts for ATC connection and a terminal block connection for Fire Alarm fan shutdown. Starters per manufacturers recommendations. Underwriters inspection and certificate required. Coordinate with Electrical Contractor.

12. Air and Water Balancing.

13. Automatic temperature controls with complete wiring (regardless of voltage).

14. Testing, adjusting and start-up of equipment.

15. Painting and identification of all equipment and piping.

16. Firestopping per NFPA requirements (UL approved systems).

17. Operating and maintenance instructions.

18. As-Built Drawings - Refer to Division 1.

19. Cutting and Patching - Refer to Division 1.

20. Excavation and Backfill - Refer to Division 2.

B. Coordination Drawings (if applicable): Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of any and all claims for either or both “time” and “money”.

1.2 REMOVALS

A. Removals should be coordinated with other trades affected.

B. Piping which penetrates the construction may be cut and capped provided capping is done beneath the finished surfaces so that construction over it can be achieved.

C. Soot Removal: In connection with the dismantling of boilers, Contractor shall gather together with a vacuum-cleaning machine all accumulations of soot. He shall remove all soot from the base of the chimney.

D. All removals shall be removed from the site.

1.3 ALTERATION WORK

A. All equipment, piping, control components, etc. to be removed, shall be disposed of or salvaged as directed by the Owner. They shall not be removed from the premises without the Owner’s approval.

B. All piping to be removed shall be properly plugged or capped so that upon completion of all new work, all abandoned piping shall be concealed in finished areas.

C. No dead ends shall be left on any piping upon completion of job. The existing system shall be left in perfect working order upon completion of new work.

D. Location and sizes of existing piping, ductwork, equipment, etc. are approximate. Exact sizes and locations of all existing work shall be verified on the job.

END OF SECTION 230110

SECTION 230200 - HYDRONIC SPECIALTIES

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 AIR VENTS

A. Install at all high points automatic air vents to eliminate air binding. All automatic air vents shall be approved heavy duty type equipped with petcocks and tubing for manual venting. All vents installed in coils, etc. shall be of manual key operated type.

B. All vents concealed from view shall be accessible through access doors. Vents shall be by Hoffman, Anderson or ITT Bell & Gossett, 125 psig rated.

2.2 PRESSURE GAUGES

A. Furnish and install pressure gauges on suction and discharge sides of each pump and as required to check operation of equipment; pressure gauges shall have 4-1/2"diameter dials, Ashton, Ashcroft or approved equal.

2.3 THERMOMETERS

A. Install thermometers at all locations in piping system as noted on Drawings and as required to check system performance. Thermometers shall be installed at the supply and return of coils and 3-way diverting valves as manufactured by Trerice, Weksler or Moeller, with 4-1/2 inch face, cast aluminum case, chrome plated steel ring, white background with black embossed markings, glass window, stainless steel pointer, brass movement, 316 stainless steel bulb. Provide separable, universal angle sockets for all thermometers.

2.4 COMBINATION BALANCING / SHUT-OFF VALVES (Circuit Sensors /Setters and Flow Meters)

A. Provide Circuit Sensor/Setter balance valves as manufactured by Bell & Gossett or approved equal.

B. Circuit Sensors: Furnish and install as shown on Drawings, a cast iron wafer-type flow meter designed for low pressure drop operation.

1. The flow meter will be equipped with brass readout valves (with integral check valve) for taking differential pressure readings across the orifice of the flow meter.
2. The flow meter shall be designed to operate at a maximum working pressure of 300 psig at 250 degrees F.
3. The flow meter must be furnished with a calibrated nameplate for determining an accurate system flow rate.

4. Each flow meter shall be ITT Bell & Gossett Circuit Sensor Flow Meter model no. OP.

C. Circuit Setters: (1/2”-3”) Furnish and install as shown on Drawings and with manufacturer's recommendations Bell & Gossett® Circuit Setter® Plus calibrated balance valve Model CB or Model MC as manufactured by Xylem.

1. Valves to be designed to allow installing Contractor to pre-set balance points for proportional system balance prior to system start-up.

2. Valve body shall be constructed out of lead-free brass.

3. Valve shall include a ball valve constructed in 304 Stainless Steel.

4. Valve shall be AB1953 and CSA certified and compliant with Vermont 152S, Maryland House Bill HB372, Senate Bill S.3874, and NSF/ANSI-372.

5. Valve body shall include two pressure/temperature ports.

6. Valve body shall include an optional drain valve port.

7. Valve shall utilize a calibrated nameplate with a memory stop.

8. Valve shall utilize a reduced port design that provides velocity head recovery.

9. Valve temperature range shall be from -4°F (-20°C) to 250°F (121°C).

10. Model CB: Valve shall have either NPTF thread or SWTF end connections.

11. Model CB**:** Valves with NPT end connections shall be rated for 400 PSIG working pressure.

12. Model CB**:** Valves with SWTF end connections shall be rated for a maximum of 300 PSIG working pressure.

13. Model MC: Valve shall be rated for 300 PSIG working pressure.

14. Model MC: Valve shall include a SWTF or NPTF fixed end connection on the discharge end and a union tailpiece adapter with choice of SWTF, NPTF thread, or NPTM thread tailpiece connection on the supply end. The union tailpiece end should include a union nut that can secure the tailpiece to the body of the valve to create a water-tight seal.

15. Valves to have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated nameplate to assure specific valve settings. Valves to be leak-tight at full rated working pressure. Valves 4-inch pipe size to be of cast iron body/brass vane construction with differential pressure read-out ports fitted with internal EPT insert and check valve.

16. Provide Extended Pressure/Temperature Ports and Drain Valve/Extended Drain Valve

D. Circuit Setters: (4”-12”) Furnish and install as shown on Drawings and with manufacturer's recommendations Bell & Gossett® Circuit Setter® Plus calibrated balance valve Model CB as manufactured by Xylem.

1. Valves to be designed to allow installing Contractor to pre-set balance points for proportional system balance prior to system start-up.

2. Valve body shall be constructed out of cast iron and rated for 175 PSIG working pressure (if flanged) or constructed out of ductile iron and rated for 300 PSIG working pressure (if grooved).

3. Valve shall be a multi-turn globe style valve.

4. Valve shall include a brass disc.

5. Valve disc shall have a soft seat design made of EPDM.

6. (If Flanged) Valves shall include ANSI Class 125# flanged connections.

7. (If Grooved) Valves shall include grooved end connections.

8. Valve body shall include two pressure/temperature ports.

9. Valve shall utilize a calibrated nameplate with position indicator from 0 to 100% open.

10. Valve shall include a memory button to allow for positioning the valve to the appropriate set position after closing.

11. Valve temperature range shall be from -4°F (-20°C) to 250°F (121°C).

12. Valves to have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated nameplate to assure specific valve settings. Valves to be leak-tight at full rated working pressure. Valves 4-inch pipe size to be of cast iron body/brass vane construction with differential pressure read-out ports fitted with internal EPT insert and check valve.

13. Readout Meters: Provide a portable Readout Meter with provision for hanging, capable of indicating pressure differential across a system component. Unit to be complete with all necessary hoses, shut-off and vent valves, and carrying case. Reading range to be .5' to .16'. Read Out Kits to be ITT Bell & Gossett model no. RO-3.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230200

SECTION 230201 - STEAM AND STEAM CONDENSATE SPECIALTIES

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 SECTION INCLUDES

A. Steam traps.

B. Steam air vents.

C. Pressure reducing valves.

D. Steam safety valves.

E. Steam condensate meters.

1.2 REFERENCES

A. ASME - Boiler and Pressure Vessel Codes, SEC 8-D - Rules for Construction of Pressure Vessels.

B. ASME B31.9 - Building Services Piping.

C. ASTM A105 - Forgings, Carbon Steel, for Piping Components.

D. ASTM A126 - Grey Iron Casings for Valves, Flanges, and Pipe Fittings.

E. ASTM A216 - Steel Casings, Carbon, Suitable for Fusion Welding for High Temperature Service.

F. ASTM A395 - Ferric Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volt Maximum).

H. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

A. Use Float and Thermostatic Traps for: Low pressure drips, medium and low pressure condensate drainage of modulating type equipment.

B. Use Inverted Bucket Steam Traps for: High and Medium pressure drips, high pressure condensate drainage.

C. Use thermostatic steam traps for various radiation types.

1.4 PERFORMANCE REQUIREMENTS

A. Steam Traps

1. Select to handle minimum of two times maximum condensate load of apparatus served.

2. Pressure Differentials:

a. Low Pressure Systems (15 psi maximum): 2 psi.

b. Medium Pressure Steam (60 psi maximum): size tarp to yield 20-psig outlet pressure.

c. High Pressure Steam (150 psi maximum): Traps discharging to medium pressure system shall be sized for 50-psig outlet pressure. Traps discharging to low pressure system shall be sized for 20-psig outlet pressure.

1.5 SUBMITTALS

A. Submit under provisions of Contract requirements.

B. Product Data: Submit Product Data for manufactured products and assemblies required for this project.

1. Provide for manufactured products and assemblies required for this project.

2. Include product description, model, dimensions, component sizes, rough-in requirements, service sizes and finishes.

3. Submit schedule indicating manufacturer, model number, size, location rated capacity, load served and features for each specialty.

4. Include electrical characteristics and connection requirements.

C. Manufacturer’s Installation Instructions: Indicate application, selection and hookup configuration. Include pipe and necessary elevations.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Contract.

B. Operation and Maintenance Data: Include installation instructions, servicing requirements and recommended spare parts lists.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with New York State standards for installation of boilers and pressure vessels.

B. Maintain one copy document on site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.9 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 code for installation of steam and steam condensate piping and specialties.

B. Product Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose intended.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Contract.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

E. Protect piping systems from entry of foreign materials by temporary covers, completing section of the work, and isolating parts of completed system.

1.7 EXTRA MATERIALS

A. Provide two service kits for each size and type of steam trap.

PART 2 - PRODUCTS

2.1 INVERTED BUCKET TRAPS

A. Manufacturers

1. Armstrong
2. Other acceptable manufactures offering equivalent products.

a. Spirax/Sarco, Inc.
b. Dunham

B. Trap

1. Construction: ASTM A126, cast iron body with bolted cover, stainless steel bucket, stainless steel bucket, stainless steel seats and plungers and stainless steel lever mechanism with knife edge operating surfaces.

2. Rating: 250-psig WSP.

3. Features: Access to internal parts without disturbing piping, top test plug, bottom drain plugs.

4. Accessories: Integral inlet strainer of stainless steel, integral inlet check valve, integral bimetal air vent.

2.2 FLOAT AND THERMOSTATIC TRAPS

A. Manufacturers

1. Spirax/Sarco, Inc.
2. Other acceptable manufactures offering equivalent products.

a. Mueller
b. Dunham

B. Trap

1. Construction: ASTM A126, cast iron body with bolted cover, stainless steel or bronze bellows type air vent, stainless steel or copper float, stainless steel lever and valve assembly.

2. Rating: 125-psig 150-psig 300-psig WSP.

3. Features: Access to internal parts without disturbing piping bottom drain plug.

4. Accessories: Gauge glass with shut-off cocks.

2.3 THERMODYNAMIC TRAPS

A. Manufacturers

1. Armstrong
2. Other acceptable manufactures offering equivalent products.

a. Spirax/Sarco, Inc.
b. Dunham

B. Trap

1. Construction: Stainless steel body, disc and cap.

2. Rating: 300-psig.

3. Features: Stainless steel insulating cap 1/4” steel blow down valve, integral strainer.

2.4 THERMOSTATIC TRAPS

A. Pressure Balanced

1. Manufacturers

a. Spirax/Sarco, Inc.
b. Mueller
c. Armstrong

2. Trap: ASTM A395 cast iron body and bolted or screwed cover for 125-psig or 300-psig WSP; as required to suit pressures, stainless steel bellows, stainless steel valve and seat; integral stainless steel strainer.

2.5 STEAM AIR VENTS

A. 125-psig WSP

1. Manufacturers

a. Spirax/Sarco, Inc.
b. Mueller
c. Armstrong

2. Balanced Pressure Type: Cast brass body and cover; access to internal parts without disturbing piping; stainless steel bellows, stainless steel valve and seat.

B. 225-psig WSP

1. Manufacturers

a. Spirax/Sarco, Inc.
b. Mueller
c. Armstrong

2. Balanced Pressure Type: ASTM A126 cast iron body and cover; access to internal parts without disturbing piping; stainless steel bellows, stainless steel valve and seat.

2.6 PRESSURE REDUCING VALVES

A. Manufacturers

1. Leslie
2. Spirax/Sarco

B. Steam pressure reducing valves shall provide maximum capacities shown on the Drawings with an accuracy of regulation equal to 1-psi and allow for variation of the set pressure while in service.

C. Valve shall be Leslie Cast Iron Body Globe Valve with braided Teflon graphite packing. End connections shall be Class 250 flanged. Body/bonnet material shall be cast iron. Trim shall be stainless steel Stellited. Les-Sonic cage shall be provided. Plug material shall be AISI 410 with PTFE seal. Gasket material shall be filled type 304 Stainless Steel. Seat ring material shall be AISI type 400 Stainless Steel, Stellited. Cage material shall be ASTM A-743 Gr. CA 40 St. Stem material shall be AISI type 316. Design temperature and pressure shall be 250-psig/400^{o} F.

2.7 SAFETY RELIEF VALVES

A. Manufacturers

1. Spirax/Sarco, Inc.
2. Other acceptable manufactures offering equivalent products.

a. Armstrong
b. Kunkler

B. Steam safety valves shall have set pressures and rated capacities as shown in the schedules. Safety valves should be based on the capacity of the PRV under wide open or maximum flow conditions, or the flow capacity through the valve bypass, which ever is greater.

C. Safety valves for unfired vessels shall be selected for 90% basis, 10% accumulation in accordance with ASME unfired pressure vessel code. Section VIII. Valves for power boilers shall be selected for 90% basis, 3% accumulation in accordance with ASME code, Section I and shall be stamped. Relief valves shall carry ASME code symbol and be rated for 250-psig SWP.

D. Safety valves shall be fitted with enclosed spring and external lifting lever. Furnish with manufacturer's standard connections and valve bodies of either bronze or cast iron with internals of brass or stainless steel.

E. Drip pan elbows for use with safety valve shall be cast iron rated in accordance with ASTM A126 Class B and be of the same size as the safety relief outlet or larger. Pipe as shown on Drawings.

F. All risers shall have drip pan elbows and the riser pipe after the drip pan elbow shall be unrestricted and larger than the drip pan outlet size. Ensure that all safety valve and drip pan elbow discharge is routed to a safe vent or drain.

PART 3 - EXECUTION

3.1 INSTALLATION OPERATION

A. Install specialties in accordance with manufacturer's instructions.

B. Steam Traps

1. Provide minimum 3/4" size on steam mains and branches.
2. Install with union or flanged connections at both ends.
3. Provide gate valve and strainer at inlet and gate valve, check valve at discharge.
4. Provide minimum 10" long, line size dirt pocket between apparatus and trap.

C. Remove thermostatic elements from steam traps during temporary and trial usage, until system has been operated and dirt pockets cleaned of sediment and scale.

D. In high pressure and medium pressure mains, provide 3/4” nipple in bottom of main, extending 3/4” into and above bottom of pipe. Provide dirt pocket with 1/2” high pressure thermostatic trap.

E. Remove and recondition pressure reducing valve, pressure controllers, air filter regulators and transfer valve as noted on Drawings. Reconditioned equipment shall have new full warranty.

END OF SECTION 230201

SECTION 230205 – INDOOR AIR HANDLING UNITS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 SECTION INCLUDES

Design, performance criteria, controls, and installation requirements for Semi-Custom Air Handling Units.

1.2 REFERENCES

A. AMCA Standard 99: Standards Handbook
B. AMCA/ANSI Standard 204: Balance Quality and Vibration Levels for Fans
C. AMCA Standard 210: Laboratory Methods of Testing Fans for Ratings
D. AMCA Standard 300: Reverberant Room Method for Sound Testing of Fans
E. AMCA Standard 500:Test Methods for Louvers, Dampers and Shutters
F. AHRI Standard 410: Forced-Circulation Air-Cooling and Air-Heating Coil
G. ASHRAE Standard 52: Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter
H. ASHRAE/ANSI Standard 111: Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems
I. UL Standard 1995: Heating and Cooling Equipment
J. ASTM A-525: Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

1.3 OPERATION AND MAINTENANCE DATA

A. Include data on design, inspection and procedures related to preventative maintenance. Operation and Maintenance manuals shall be submitted at the time of unit shipment.

1.4 QUALIFICATIONS

A. Manufacturer shall be a company specializing in the design and manufacture of commercial / industrial HVAC equipment. Manufacturer shall have been in production of HVAC equipment for a minimum of 5 years.

B. Each unit shall bear an ETL or UL label under UL Standard 1995 indicating the complete unit is listed as an assembly. ETL or UL listing of individual components, or control panels only, is not acceptable.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under the supervision of the owner.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate work performed under this section with work performed under the separate installation contract.

1.7 WARRANTY

A. The complete unit shall be covered with a parts only warranty for 18 months as a standard. An optional 24 month shall also be available. The warranty period shall start on the date of equipment shipment from VTS America's manufacturing facility.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Provide air handling units as manufactured by VTS, or approved equal.

2.2 GENERAL

A. Furnish and install where shown on the plans air handling units with construction features as specified below. The units shall be provided and installed in strict accordance with the specifications. All units shall be complete with all components and accessories as specified. Any exceptions must be clearly defined. The contractor shall be responsible for any additional expenses that may occur due to any exception made.

2.3 FACTORY TESTING AND QUALITY CONTROL

A. Standard Factory Tests: The fans shall be factory run tested to ensure structural integrity and proper RPM. All electrical circuits shall be tested to ensure correct operation before shipment of unit. Units shall pass quality control and be thoroughly cleaned prior to shipment.

2.4 UNIT CONSTRUCTION DESCRIPTION

A. General: Provide factory-fabricated air handling units with capacity as indicated on the schedule. Units shall have overall dimensions as indicated and fit into the space available with adequate clearance for service as determined by the Engineer. Units shall be completely assembled or multiple sectioned, shall be shipped as a single package (except where shipping limitations prevent) de-mounted into modular sections in the field by the contractor. Units shall be furnished with sufficient gasket and bolts for reassembly in the field by the contractor. Unit manufacturer shall provide certified ratings conforming to the latest edition of AMCA 210, 310, 500 and AHRI 410. All electrical components and assemblies shall comply with NEMA standards. Unit internal insulation must have a flame spread rating not over 25 and smoke developed rating no higher than 50 complying with NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems." Units shall comply with NFPA 70, "National Electrical Code," as applicable for installation and electrical connections of ancillary electrical components of air handling units. Tags and decals to aid in service or indicate caution areas shall be provided. Units shall be UL or ETL listed.

B. Rigging Provision – Multiple Piece Units: Units shipped in multiple sections shall be engineered for field assembly. All gasket and necessary assembly hardware shall ship loose with unit. Junction boxes with a factory supplied numbered terminal strip shall be supplied at each shipping split for reconnection of control wiring.

C. Unit Casing – The construction of the air handling unit shall consist of a Non-skeleton structure made by a “C” or “L” sandwich 2.0 inch thick polyurethane foam with an external side 22 gauge AluZinc coated steel and 25 gauge galvanized steel on the inside, making it a double wall construction. The AluZinc coating on the exterior surface provides a minimum of 2,400 hours Salt Spray rated corrosion resistance (per ASTM B-117). All the elements are connected with sealed joints.

D. Insulation - Entire unit to be insulated with a full (R13) 2” thick closed cell foam insulation. All insulation edges shall be encapsulated within the panel. All field penetrations must be completely sealed by installing contractor.

E. Access Doors - The unit shall be equipped with a solid double wall insulated (same as the unit casing), hinged or latched access doors as shown on the plans. The doorframe shall be extruded aluminum, with a built in thermal break barrier and full perimeter gasket. The door hinge assembly shall be made of composite material.

2.5 UNIT COMPONENT DESCRIPTION

A. Unit Fans – All fans shall meet the air flow performance specified and shall not exceed the break horsepower or sound power levels specified on the mechanical equipment schedule. Fan performance shall be based on testing and be in accordance with AMCA Standards 210 and 300.

B. FANS

1. The fan shall include direct driven, arrangement up to 5 plenum fan constructed per AMCA requirements for the duty specified. Fans shall be classified as class II or class III as required; class I fans are not acceptable. Fan wheels shall be made of composite material or aluminum construction and rated in accordance with and certified by AMCA for performance. All fans shall be selected to deliver the specified airflow quantity at the specified operating Total Static Pressure and specified fan/motor speed. The fan shall be selected to operate at a system Total Static Pressure that does not exceed 90% of the specified fan’s peak static pressure producing capability at the specified fan/motor speed. Each fan/motor assembly shall include a minimum 14 gauge spun steel fan inlet funnel, and a G90 galvanized steel motor support plate and fan base with internal RIS isolation.

2. All motors shall be standard foot mounted type TEFC selected at the specified operating voltage, RPM, and efficiency as specified or as scheduled elsewhere. Motors shall meet the requirements of NEMA MG-1 Part 30 and 31, section 4.4.2. Motors shall be as manufactured by Baldor, Siemens, Toshiba or WEG that operate at varying synchronous speeds as driven by an approved VFD. Motor HP shall not exceed the scheduled HP as indicated in the AHU equipment schedule(s). Steel cased motors and/or ODP motors are not acceptable. All motors shall include permanently sealed L10-400,000 hr bearings with shaft grounding to protect the motor bearings from electrical discharge machining due to stray shaft currents. Each fan wheel shall be dynamically balanced to BV-5 or better.

3. Multiple Fan Arrays - Each fan motor shall be individually wired to a control panel containing a single VFD as the primary VFD. Each VFD shall be sized for the total connected HP for all fan motors contained in the fan array. Wire sizing shall be determined, and installed, in accordance with applicable NEC standards and local code requirements.

C. Heat Transfer Coils – Water Coil

1. Performance is to be certified under AHRI Standard 410. Coils exceeding the range of AHRI standard rating conditions shall be noted.

2. Cooling coils shall be mounted on rack to permit coils to slide out individually from the unit. Provide intermediate drain pans on all stacked cooling coils. The intermediate pan shall drain to the main drain pan. Water coils shall be constructed of seamless copper tubing mechanically expanded into fin collars. All fins shall be continuous within the coil casing to eliminate carryover inherent with a split fin design.

3. Headers are to be seamless copper with die formed tube holes.

4. Connections shall be male pipe thread (MPT) with vent and drain. All coil connections shall be extended to the exterior of the unit casing by the manufacturer. Coils shall be suitable for 261 PSIG working pressure. Maximum leak tested pressure shall be 522 PSIG and maximum burst pressure shall be 1189 PSIG.

5. Water coils shall have the following construction:
   a. 1/2" o.d. x .020" wall copper tube with .020” return bends
   b. .006" aluminum fins
   c. Stainless steel casing for 4, 6, and 8 row coils and Galvanized casing for 1, 2, and 3 row coils.

D. Heat Transfer Coils – Direct expansion coils

1. Direct expansion coils shall be constructed of seamless copper tubing mechanically expanded into fin collars. All fins shall be continuous within the coil casing to eliminate carryover inherent with a split fin design. Fins shall be die formed plate type. Headers are seamless copper with die formed tube holes. Connections shall be O.D. sweat copper and include a refrigerant distributor. Coils shall be suitable for 261 PSIG working pressure. Maximum leak tested pressure shall be 522 PSIG and maximum burst pressure shall be 1189 PSIG.
2. Heat pump direct expansion coils shall have the following construction:
   a. 1/2" o.d. x .020" wall copper tube with .020” return bends
   b. .006" aluminum fins
   c. Stainless steel coil casing
   d. 557 PSIG working pressure; maximum leak tested pressure shall be 725 PSIG

E. Condensate / Drain Pans - The drain pan shall be fabricated from stainless steel. All pans are to be pitched for complete drainage with no standing water in the unit. Provide stainless steel, 1 ¼" MPT drain connection extended to the exterior of the casing. All drain connections shall be piped and trapped separately for proper drainage.

F. Filters - Provide filters of the type indicated on the schedule. Factory fabricated filter sections shall be of the same construction and finish as the unit. Side service filter racks shall be fabricated from galvanized steel and include hinged access doors. Internal blank-offs shall be provided by the air unit manufacturer as required to prevent air bypass around the filters.

1. High Efficiency MERV 13 Pleated filters - Provide 4" deep filters as specified on the filter schedule. The filters shall be listed as Class II under UL Standard 900. Filters shall be in compliance with ANSI/UL 900 – Test Performance of Air Filters.

G. Dampers – VTS model VS or approved equal. Dampers to be airfoil, opposed blade type. Frame and dampers to be constructed out of extruded 6060-T66 aluminum. Damper blades to be connected by FRP nylon infused gears for long life. Dampers to have square actuator shaft to prevent actuator slippage. Dampers to be AMCA certified.

2.6 ELECTRICAL POWER AND CONTROLS

A. All electrical and automatic control devices not previously called out or listed below are to be furnished and installed in the field by OTHERS.

B. All wiring shall be (75°C) Insulated copper wires.

C. The unit shall feature a mounted permanent nameplate displaying at a minimum the manufacturer, serial number, model number and current and amps voltage. The unit must have an ETL or UL Listing and bear the appropriate mark.

D. Conduit shall consist of a combination of EMT or flexible metal conduit as required. Liquidtite flexible metal conduit may be used outside the air tunnel for wet locations.

E. The unit shall feature a main non-fused disconnect of the proper amp rating to allow shutoff of all electrical motors and VFDs.

F. Unit Convenience Features

1. Fan section light shall be controlled by one light switch mounted adjacent to the supply air fan access door. At the same box the convenience 115V outlet is located. All other access section lights shall be field wired.

a. Each fan motor shall be individually wired to a control panel containing a single VFD as the primary VFD. Each VFD shall be sized for the total connected HP for all fan motors contained in the fan array. Wire sizing shall be determined, and installed, in accordance with applicable NEC standards and local code requirements.

PART 3 – EXECUTION

A. DELIVERY, STORAGE, AND HANDLING

1. Deliver, store, protect and handle products under the supervision of the owner's representative and per the manufacturer's Installation, Operation & Maintenance Instructions. Store in a clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures and finish.

B. ENVIRONMENTAL REQUIREMENTS

1. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings are lubricated, and the fan(s) has been test run under observation.

C. INSTALLATION

1. Assemble and install in strict accordance with manufacturer's Operation & Maintenance Instructions, shop drawings and contract documents.

2. Verify all components, accessories and appurtenances are on site.

END OF SECTION 230205

SECTION 230210 - HEATING AND VENTILATION UNITS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 SYSTEM DESCRIPTION

A. Horizontal, Direct Drive, 2-pipe, room fan coil unit with painted finish cabinet for exposed installation or ducting.

1.2 QUALITY ASSURANCE

A. Unit shall be tested in accordance with ARI Standard 440 and ETL listed to US and Canadian safety standard UL 1995 current version.

B. Each coil shall be factory tested for leakage at 600 psig air pressure with coil submerged in water.

C. Insulation and adhesive shall meet NFPA-90A requirements for flame spread and smoke generation.

D. All equipment wiring shall comply with NEC requirements.

E. Product family is certified to standard AHRI 430 Performance Rating of Central Station Air Handling Unit Supply Fans, which utilizes AMCA 210 laboratory test standard.

1.3 DELIVERY, STORAGE AND HANDLING

A. Each unit shall be individually packaged from point of manufacture. Unit shall be handled and stored in accordance with the manufacturer’s instructions.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. General:

1. Factory-assembled, horizontal, draw-thru type fan coil for exposed or concealed installations, ducted. Unit shall be complete with water heating coil, fan(s), motor(s), drain pan, and all required wiring, piping, controls, and special features.

B. Base Unit:

1. Units shall be fabricated of galvanized or galvannealed steel, 19gauge, exterior panels with 19gauge interior panels. Internal insulation is 1" fiberglass with 1.5 pound density, providing effective acoustical and thermal control and fire safety. Cabinet shall include removable blower and filter access panels on both sides, return duct flange, filter rack and 4-in. pleated MERV 13 filter. Filter rack is field-adjustable for either 2-in. or 4-in. filter depth. Cabinet exterior has a baked on polyester powder-coated finish for corrosion and scratch resistance while providing an enhanced appearance. Painted panels shall pass 500 hour salt spray test as described in ASTM B-117.

2. The drain pan shall extend the entire length and width of the coil, with primary and auxiliary connections that are ¾" FPT.

    a. Standard – double-sloped polymer with PVC male connections.

C. Fans:

1. Direct-driven, double-width fan wheel with forward curved blades, statically and dynamically balanced. The housing shall be constructed of heavy gauge galvanized steel with die-formed inlet cones. Fan wheels shall be constructed of galvanized steel.

D. Coils:

1. Hot water heating coils in a 2 pipe system shall be 2-row, slab style perpendicular to airflow, factory installed. Coil fin spacing shall be 10 or 12 fins per inch (FPI). Tube diameter shall be 3/8" OD or ½" OD.

2. All coils shall have copper tubes and aluminum fins. Coil fins are mechanically bonded to tubes. The copper tubes comply with ASTM B-75. The fin thickness is 0.0045-in. All coils are tested with air under water.

3. Water coils are tested in accordance with AHRI 410.

E. Controls and Safeties:

1. Fan Controls: Unit shall be furnished with 24V fan controls to allow control by field-provided and installed 24V thermostat or BAS. Options include:

    a. ECM-Premium motor controls: 4 user-selectable operating speeds, each adjustable with on-board potentiometer; will allow adjustment during fan operation with blower doors closed.

    b. ECM-Premium motor controls: variable speed driven by customer-provided 0-10VDC fan signal.

2. Optional factory-wired selections:

    a. Integral door disconnect switch
    b. Fan current switch (dry contacts)
    c. Condensate overflow switch
    d. Low Limit Thermostat

F. Operating Characteristics:

1. A unit with single hydronic coil installed in a 2-pipe system shall be capable of providing heating as determined by the operating mode of the central water supply system and as determined by field-provided and installed valves and controls.

2. In all arrangements, the temperature controls are field-provided and installed and can interface with the unit per section “Controls and Safeties.”

G. Electrical Requirements:

1. Sizes 40 (4000 cfm) The unit power supply shall be 60 Hz, with standard construction 208/240V/3-phase.

H. Motors(s):

1. Sizes 40 (4000 cfm): Fan motors are ECM-Premium Symax, electrically commutated motor (ECM), up to 40% more efficient than permanent split-capacitor type induction motors, with control options that allow variable speed or on/off fan control. Size 40 motor is dual-shaft.

END OF SECTION 230210

SECTION 230216 – PACKAGED ROOF MOUNTED DOAS UNITS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 Dedicated Outdoor Air System – Rooftop

A. General

1. Provide outside air unit as manufactured by LG or approved equal.

2. Alternate manufacturers must be pre-approved and shall be subject to compliance with all the requirements listed in this specification.

3. Project is based on the specified equipment. Any additional costs associated with using alternate manufacturer's equipment shall be borne by the installing contractor or equipment provider.

4. This section includes units with integral heating/cooling/heating and cooling for outdoor/indoor installation.

5. Integral Energy Recovery device shall be a rotary air-to-air total enthalpy wheel.

6. Integral cooling source shall be chilled split system DX with remote condenser/packaged DX/Air-source heat pump.

7. Integral heat source shall be air-source heat pump with secondary duct mounted heating coil.

8. Airflow arrangement shall be Outdoor Air only/Outdoor Air with Recirculation.

9. Each unit shall be constructed in a horizontal configuration and shall incorporate additional product requirements as listed in this specification.

PART 2 – PRODUCTS

2.1 CASING/PANEL

A. The exterior casing shall have a minimum of 22-gauge, galvanized (G90) steel meeting ASTM A653 for components without a painted finish.

B. Unit’s exterior shall be supplied using G60 galvanneal steel with proprietary pre-painted material in the following PermatectorTM finish color; Concrete Gray-RAL 70023.

1. The casing shall be subjected to a salt spray test per ASTM-B117 and evaluated using ASTM-D714 and ASTM-D610 showing no observable signs of rust or blistering until reaching 2,500 hours.

2. High performance coating (Hi-Pro Poly) with an option for match color chip is available. The unit's exterior shall be supplied using G60 galvanneal steel with a high-performance proprietary coating that has been subjected to a salt spray test per ASTM-B117 and evaluated using ASTM-D714 and ASTM-D610 showing no observable signs of rust or blistering until reaching 5,000 hours.

C. Materials: Formed, 2-inch double wall closed cell foam insulated metal panels and 2" double wall closed cell foam insulated metal door construction, fabricated to permit access to internal components for maintenance.

D. Cabinet Insulation shall comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.

E. Materials: Rigid urethane foam. Foam board not acceptable.

1. Thickness: 2-inch (50.8 mm).

2. Thermal Resistance: R13.

3. Meets UL95HF-1 flame requirements.

4. Location and application: Full coverage of entire exterior to include walls, roof of unit, unit base and doors.

2.2 CABINET ASSEMBLY

A. All the internal assemblies shall have a minimum of 24 gauge, galvanized (G90) steel, except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.

B. All specified components and internal accessories factory installed shall be tested and prepared for single-point high voltage connection except with electric post heat and exhaust fan only power if dual point power is selected.

C. Unit shall be fully assembled at the factory and consists of the following:

1. An insulated metal cabinet

2. Downturn outdoor air intake hood with 2" aluminum mesh filter assembly

3. Exhaust air blower

4. Evaporator coil
5. Condensate drain pan
6. P trap
7. Energy wheel
8. Wheel frost control
9. Hot gas reheat coil
10. Packaged DX system
11. Air-Source Heat Pump
12. Phase and burnout protection
13. Motorized dampers
14. Barometric relief damper
15. Motorized recirculating damper
16. Sensors
17. Curb assembly
18. Service receptacle
19. Filter assembly for intake air
20. Supply air blower assembly
21. Exhaust/relief blower assembly
22. Filter assembly for exhaust air
23. Electrical control center

2.3 SUPPLY AIR BLOWER ASSEMBLIES

A. Blower assembly shall consist of an electric motor and direct-drive fan(s). Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor(s) shall be capable of continuous speed modulation and controlled by a VFD.

2.4 EXHAUST AIR BLOWER ASSEMBLIES

A. Blower assembly shall consist of an electric motor, with an ODP enclosure and a direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor shall be capable of continuous speed modulation and controlled by a VFD.

2.5 ACCESS PANELS / DOORS

A. Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components.

B. Doors and access panels shall be fabricated of minimum 22 gauge galvanized G90 steel or painted galvannealed steel with 2 inch closed cell foam insulation.

2.6 EVAPORATOR COIL

A. Evaporator coil shall be AHRI Certified and shall be (silver) soldered or brazed into the compressed refrigerant system. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a galvanized steel frame.

B. Units with two compressors shall have the evaporator coil of “interlaced” configuration, permitting independent operation of either compressor without conflict with the other compressor.

C. Optional: The evaporator and condenser coils are coated with ElectroFin® coil coating, E-Coat coated coils are tested and passed ASTM B-117 Salt Spray tests exceeding 10,000 hours.

2.7 CONTROL PANEL / CONNECTIONS

A. Rooftop Ventilator units 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.

B. RTU shall be equipped with a Unit Disconnect Switch.

2.8 CONDENSATE DRAIN PAN

A. Drain Pan shall be an integral part of the unit whenever a cooling option is included. Pan shall be formed of welded austenitic stainless steel sheet material and provided with a drain connection at the front (access side) for connection to a P trap.

B. Drain pan shall be sloped in two directions to provide positive draining and drain connector shall be sealed at penetration through cabinet wall.

2.9 P TRAP

A. If the unit is equipped with a condensate drain pan, contractor shall provide, or fabricate, and install an appropriate P trap, in accordance with all local and area codes and Best Practices.

2.10 ENERGY WHEEL

A. Unit energy wheel shall handle the full volume of outdoor and exhaust air without an energy wheel bypass damper(s).

B. Bypass dampers are only acceptable during economizer operation and cannot be used during normal operation.

C. Energy wheel shall be of total enthalpy, rotary air-to-air type and shall be an element of a removable energy wheel cassette.

D. The cassette shall consist of a galvanized steel framework (designed to produce laminar air flow through the wheel), an energy wheel as specified and a motor and drive assembly.

1. The cassette shall incorporate a pre-tensioned urethane drive belt or a link style belt with a five-year warranty.

2. The wheel media shall be a polymer film matrix in a stainless-steel framework.

3. Wheel shall be comprised of individual segments that are removable for servicing Silica gel desiccant shall be permanently bonded to the polymer film.

4. Aluminum (Semco) energy wheel.

E. The energy wheel is to have a five-year warranty.

F. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.

2.11 WHEEL FROST CONTROL

A. Energy wheel VFD Frost control will modulate the wheel speed based on exhaust air leaving air temperature.

B. Reheat Coil with factory installed modulating hot gas reheat valve.

1. Coil(s) shall be coated with ElectroFin® coil coating.

2.12 PACKAGED DX SYSTEM

A. Unit shall have an integral compressor(s) and evaporator coil located within the weather-tight unit housing.

1. The evaporator and condenser coils shall be coated with ElectroFin® coil coating.

B. Condenser coils and appurtenant condenser fan assemblies shall be factory installed as integral subassemblies of the unit and mounted on the exterior of the unit.

1. Unit condenser fans shall feature swept owlet blade design resulting in reduced sound levels.

2. Condenser fan motors shall be three phase, external rotor, type 56 frame, open air over and shaft up.

3. Each condenser fan motor shall have a vented frame, rated for continuous duty and be equipped with an automatic reset thermal protector.

4. Lead condenser fan will have an electronically commutated (EC) motor that will modulate to maintain a head pressure set point.

C. Motors shall be UL Recognized and CSA Certified. The refrigerant compressor(s) shall be inverter driven.

D. Inverter hermetic scroll-type and shall be equipped with:

1. Liquid line filter drier

2. Thermostatic (optional: electronic) expansion valves (TXV) (EXV)(s)

3. Manual reset high pressure and low pressure cutouts

4. Sensors

5. Service ports and safety devices.

6. Compressed refrigerant system shall be fully charged with R-410A refrigerant.

7. Each compressor shall be factory-equipped with electric crankcase heater to boil off liquid refrigerant from the oil.

2.13 AIR SOURCE HEAT PUMP

A. Unit shall have an integral compressor(s) and indoor coil located within the weather-tight unit housing.

B. The condensing/evaporator and condensing coils are coated with Electrofin® coil coating.

C. Outdoor coils and appurtenant outdoor fan assemblies shall be factory installed as integral subassemblies of the unit and mounted on the exterior of the unit.

D. Lead/All condenser fan(s) will have an electronically commutated (EC) motor that will modulate to maintain a head pressure set point.

E. Motors shall be UL recognized and CSA certified. The lead refrigerant compressor shall be inverter hermetic scroll type.

F. Compressors shall be equipped with liquid line filter drier, expansion valve, accumulator, sight glass, manual reset high pressure and low-pressure cutouts and all appurtenant sensors, service ports and safety devices. Compressed refrigerant system shall be fully charged with R-410A refrigerant. Each compressor shall be factory-equipped with an electric crankcase heater to boil off liquid refrigerant from the oil.

2.14 PACKAGED DX CONTROL AND DIAGNOSTICS

A. The Packaged DX system shall be controlled by an onboard digital controller (DDC) that indicates both owner-supplied settings and fault conditions that may occur.

B. The DDC shall be programmed to indicate the following faults:

1. Global alarm condition (active when there is at least one alarm)

2. Supply Air Proving alarm

3. Dirty Filter alarm

4. Compressor Trip alarm

5. Compressor Locked Out alarm

C. Supply Air Temperature Low Limit alarm

1. Sensor #1 Out of Range (outside air temperature)

2. Sensor #2 Out of Range (supply air temperature)

3. Sensor #3 Out of Range (cold coil leaving air temperature)

2.15 PHASE AND BURNOUT PROTECTION

A. RTU shall have a factory-installed phase monitor to detect electric supply phase loss and voltage brown-out conditions.

B. Upon detection of a fault, the monitor shall disconnect supply voltage to all motors.

2.16 MOTORIZED DAMPERS / OUTDOOR AIR / RETURN AIR

A. Damper shall be of (optional: insulated) low leakage AMCA Class 1A certified construction.

B. Leakage rate shall not exceed 3 CFM/ft^2 @ 1 in. wg. and shall be factory installed.

C. AMCA Class 1A motorized recirculating air damper designed to permit 100% maximum recirculation of return air shall be factory installed.

2.17 SENSORS

A. Sensors are considered to be part of various optional operational modes or device controllers and are to be factory supplied and installed as specified by the A/E.

2.18 CURB ASSEMBLY

A. A curb assembly made of 14-gauge galvanized steel shall be provided by the factory for assembly and installation as part of this division.

B. The curb assembly shall provide perimeter support of the entire unit and shall have duct adapter(s) for supply air and return air.

C. Curb assembly shall enclose the underside of the unit and shall be sized to fit into a recess in the bottom of the unit.

D. Contractor shall be responsible for coordinating with roofing contractor to ensure curb unit is properly flashed to provide protection against weather/moisture penetration.

E. Contractor shall provide and install appropriate insulation for the curb assembly. The curb shall be the height of (14", 18", 24", 36").

2.19 SERVICE RECEPTACLE

A. 120 VAC GFCI service outlet shall be factory-provided and installed by this contractor in a location designated by the A/E. Unit contains a 120 VAC transformer to provide power to service outlet.

2.20 HAIL GUARDS

A. Protects the condensing unit from damage due to extreme weather conditions such as hail and flying debris.

2.21 BLOWER/MOTOR ASSEMBLY

A. Blower section construction Supply Air

1. Direct drive motor(s) and blower(s) shall be assembled on a 14 gauge galvanized steel platform and shall be equipped with 1.125 inch thick neoprene vibration isolation devices.

2. Blower assemblies shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

3. Fan: Direct drive, airfoil plenum fan with painted steel or aluminum wheels statically and dynamically balanced and AMCA certified for air and sound performance.

4. Blower section motor source quality control

a. Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency.

a. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating."

B. Motors

1. General

a. Blower motors greater than ¾ horsepower shall be "NEMA Premium™" unless otherwise indicated.

b. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE enclosures is not acceptable.

c. Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure.

d. Motors shall be 60 cycle, 3 phase 208/230/460 volts.

e. The designation “NEMA Premium™ applies to electric motors with efficiencies that are “better than EPAct.” The terms “high efficiency” have no industry definitions.

2.22 FILTER ASSEMBLY

A. Units shall have supply final air filter shall be of 2 inch MERV 8.

1. Optional: hood filter shall be of 1 inch aluminum type.

2. Optional: 4 inch MERV 8, MERV 13 with a 2 inch MERV 8 pre-filter, MERV 13, MERV 14 disposable pleated type.

3. Energy recovery section shall have outdoor air and exhaust air filters of 2 inch MERV 8.

B. Additional Materials

1. Furnish Extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

a. Filters: Sets of MERV 8/MERV 8 and MERV 13/MERV 14 disposable filters for each unit. When MERV 13 filters are specified, they are used in tandem with MERV 8 pre-filters for Supply Air only.

2.23 UNIT CONTROLS

A. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors, or it can be operated as a heating and cooling system controlled by a Building Management System (BMS).

B. This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.

1. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status.

2. DDC controller shall have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software.

3. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable.

4. Alarm readouts consisting of flashing light codes are not acceptable.

C. RTU supply fan shall be configured for Constant Volume (ON / OFF)

1. Optional: network control, CO2 sensor by factory, duct pressure by factory, 0 – 10 VDC by others to DDC, Single Zone VAV.

D. Exhaust fan shall be configured for Constant Volume (ON /OFF)

1. Network control, building pressure by factory, damper tracking, 0-10 VCD by others to DDC, Supply Tracking.

E. Outside Air / Return Air damper control shall be field adjustable two-position,

1. Network control, CO2 sensor by factory.

2. Economizer control shall be temperature, temperature / dew point, comparative temperature, comparative enthalpy.

3. Dirty filter sensor shall be factory-installed.

F. Operating protocol

1. The DDC shall be factory-programmed for Bacnet IP and Modbus RTU standard.

2. Optional: BACnet MSTP, Modbus, Modbus IP

3. Must be compatible with LG AC Smart Controller.

4. Graphical Web UI required.

G. Variable Frequency Drive (VFD) unit shall have factory installed variable frequency drive for modulation of the supply air blower assembly and exhaust air blower assembly. The VFD shall be factory-programmed for unit-specific requirements and shall not require additional field programming to operate.

1. Airflow monitoring required in the Outdoor / Exhaust / Supply / All airstreams.

2. Room thermostat shall be provided as a shipped loose item. Room thermostat and room humidity sensor shall be provided as a shipped loose item.

H. Controller shall auto trend 7 days of operating points for troubleshooting purposes.

I. Embedded web page with complete web user interface to allow full remote control and monitoring of unit.

J. Alarm Recording: Controller shall store all alarm events for download.

K. Alarm Operating Snapshot: Controller shall store operating inputs and outputs at time of alarm.

2.24 SUBMITTALS

A. Product Data: For each type or model include the following:

1. Complete fan performance curves for Supply Air and Exhaust Air with system operating conditions indicated as tested on an AMCA Certified Chamber.

2. Sound performance data for Supply Air and Exhaust Air as tested on an AMCA Certified chamber.

3. Motor ratings, electrical characteristics, motor and fan accessories.

4. Performance ratings for all chilled water or DX coils.

5. Dimensioned drawings for each type of installation, showing isometric and plan views, to include location of attached ductwork and service clearance requirements.

6. Estimated gross weight of each installed unit.

7. Installation, Operation and Maintenance manual (IOM) for each model.

8. Microprocessor Controller (DDC) specifications to include available options and operating protocols. Include complete data on all factory-supplied input devices. Modbus RTU and BACnet IP are standard protocols. They must be compatible with LG AC Smart Controller.

9. AHRI Certified coil performance ratings with system operating conditions indicated. Ratings shall be in accordance with Standard 410.

10. Cabinet finish Concrete Gray-RAL 7023 is standard.

11. Energy wheel performance data for both summer and winter operation.

12. Electrical consumption data and construction specification for electric heater, to include heat output, warranty and safety certifications.

2.25 CONNECTIONS

A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

1. Piping installation requirements are specified in Division 22 (Plumbing). Drawings indicate general arrangement of piping, fittings and specialties.

2. Duct installation and connection requirements are specified in Division 23 of this document.

3. Electrical installation requirements are specified in Division 26 of this document.

2.26 EXAMINATION

A. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.

B. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

2.27 INSTALLATION

A. 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.

2.28 COORDINATION

A. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.

B. Coordinate location of water system fittings to ensure correct positioning for connection to the water coil and condensate drain pipe.

C. Coordinate sequencing of construction of associated plumbing, HVAC, electrical supply and sheet metal contractor.

2.29 QUALITY ASSURANCE

A. Source Limitations: Obtain unit with all appurtenant components or accessories from a single manufacturer.

B. For the actual fabrication, installations, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer's current recommended methods of installation.

C. Product Options: Drawings must indicate size, profiles, and dimensional requirements of Energy Recovery Unit and are to be based on the specific system indicated. Refer to Division 1 Section "Product Requirements".

D. Certifications

1. Blowers shall be AMCA Certified for airflow.

2. Entire unit shall be ETL Certified per U.L. 1995 and bear an ETL sticker.

3. Energy Wheel shall be AHRI Certified per Standard 1060.

4. Coils shall be recognized components for ANSI/UL 1995, CAN/CSA c22.2 No 236.05. DX and water coils shall be AHRI Certified per standard 410-2001.

2.30 FIELD QUALITY CONTROL

A. Manufacturer's Field Service

1. Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections.

B. Reports results to A/E in writing

1. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

PART 3 – EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 COORDINATION

A. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.

B. Coordinate location of water system fittings to ensure correct positioning for condensate drain pipe.

C. Coordinate sequencing of construction of associated plumbing, HVAC, electrical supply and sheet metal contractor.

3.4 QUALITY ASSURANCE

A. Source Limitations: Obtain unit with all appurtenant components or accessories from a single manufacturer.

B. For the actual fabrication, installations, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer’s current recommended methods of installation.

C. Product Options: Drawings must indicate size, profiles, and dimensional requirements of Energy Recovery Unit and are to be based on the specific system indicated. Refer to Division 1 Section “Product Requirements”.

D. Certifications

1. Blowers shall be AMCA Certified for airflow.
2. Entire unit shall be ETL Certified per U.L. 1995 and bear an ETL sticker.
3. Energy Wheel shall be AHRI Certified per Standard 1060.

3.5 FIELD QUALITY CONTROL

A. Manufacturer’s Field Service

1. Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections.

B. Reports results to A/E in writing

1. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.6 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230216

SECTION 230220 - INDOOR DOAS UNITS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 GENERAL

A. Provide outside air unit as manufactured by LG or approved equal.

B. Alternate manufacturers must be approved and shall be subject to compliance with all the requirements listed in this specification.

C. Project is based on the specified equipment. Any additional costs associated with using alternate manufacturer's equipment shall be borne by the installing contractor or equipment provider.

D. This section includes units connectable to remote condensing units for heating/cooling/dehumidification and for outdoor installation.

E. Heat source shall be from remote heat pump condenser. Minimum entering air temperature in heating shall be 14°F. Electric pre-heater will be used when entering air temp is below 14°F.

F. Cooling source shall be split system remote condenser with invertor compressors.

G. Airflow arrangement shall be Outdoor Air only.

H. Each unit shall be constructed in a horizontal configuration and shall incorporate additional product requirements as listed in this specification.

2.1 DEDICATED OUTDOOR AIR SYTEM

A. Casing

1. Exterior wall constructed using 18 gauge SGCC Z22 galvanized steel with internal closed cell Polyethylene foam insulation.

B. Cabinet Assembly

1. All the internal assemblies shall use 18 gauge SGCC galvanized steel.
2. All specified components and internal accessories factory installed shall be tested and prepared for single-point high voltage connection.
3. Unit shall be fully assembled at the factory and consists of the following:
   a. Single wall metal cabinet
   b. 1” PE foam, external insulation with R-value of 3.55
   c. DX Main coil
   d. Hot gas reheat coil
   e. Condensate drain pan

f. Condensate drain pump
g. Integrated Heat Recovery Box
h. Sensors
i. Supply air blower assembly
j. Filter assembly for DX Main coil with 2” Thick MERV 8 filters
k. Electrical control center.

4. Main DX (Evaporator) Coil
   a. Evaporator coil shall be (silver) soldered or brazed into the refrigerant system. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a SGCC steel frame.

5. Hot Gas Reheat Coil
   a. Reheat coil shall be (silver) soldered or brazed into the refrigerant system with factory installed modulating valve. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a SGCC steel frame.

6. Control panel / connections
   a. Units 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.

7. Condensate drain pan:
   a. Drain Pan shall be an integral part of the unit. Pan shall be formed of welded 18 gauge SGCC galvanized sheet material with proprietary pre-painted (Dawn Gray-RAL 7037) and provided with a drain connection for a field provided P trap.
   b. Drain pan shall be sloped in two directions to provide positive draining and drain connector shall be sealed at penetration through cabinet wall.

8. Condensate drain pump
   a. Integrated condensate drain pump with overflow switch shall operate when unit is in cooling or dehumidification modes.

9. Control and Diagnostics
   a. The DOAS system shall be controlled by an onboard digital controller (DDC) that indicates both owner-supplied settings and fault conditions that may occur.
   b. The DDC shall be programmed to indicate the following faults:
      i. Global alarm condition (active when there is at least one alarm)
      ii. Outdoor Unit (condenser) Error Alarm
      iii. Supply Air Temperature Low Limit Alarm
         a) Sensor #1 Out of Range (outside air temperature)
         b) Sensor #2 Out of Range (supply air temperature)
         c) Sensor #3 Out of Range (cold coil leaving air temperature)

10. Sensors are considered to be part of various optional operational modes or device controllers and are to be factory supplied and installed as specified by the design engineer.
    a. Factory install sensors:
       i. Supply Air Temperature Sensor
       ii. Outdoor Air Temperature Sensor
       iii. Outdoor Air Humidity Sensor
    b. Field Supplied and Installed Sensors

i. Supply Duct Air Temperature Sensor
ii. Supply Duct Air Humidity Sensor
iii. Space Humidity Sensor

C. Blower/Motor Assembly

1. Blower section construction Supply Air

a. Direct drive motor(s) and blower(s) shall be assembled on a 13 gauge galvanized steel platform

b. Blower assemblies shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

c. Fan: Direct drive, Sirroco fan with painted steel wheels statically and dynamically balanced and AMCA certified for air and sound performance.

d. Blower section motor source quality control

i. Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency.

ii. Ratings are to be established in accordance with AMCA 210, “Laboratory Methods of Testing Fans for Rating.”

2. Motors

a. General

i. Blower Motors shall be BLDC motors, Supply fan motor shall have Auto CFM modulation control or RPM control. Auto CEM Control is enabled with factory mounted differential pressure sensor. Microprocessor controller shall set CFM value and supply fan motor will modulate to maintain target CFM value even as external static pressure changes

D. Filter Assembly

1. Units shall have supply final air filter shall be of 2 inch MERV 13

E. Unit Controls

1. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers and sensors, or it can be operated as a heating and cooling system controlled by a Building Management System (BMS).

2. This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.

3. Supply fan shall be configured for Constant Volume

a. Capacity Control: Control air volume by RPM percentage.

b. CFM Control: Fan to follow target CFM set by user and automatically adjust for external static pressure changes.

4. Operating protocol

a. The DDC shall be factory-programmed for Bacnet IP and Modbus RTU standard.

b. Must be compatible with LG AC Smart Controller.

c. Graphical Web UI required.

5. Embedded web page with complete web user interface to allow full remote control and monitoring of unit.

6. Alarm Recording: Controller shall store all alarm events.

7. Alarm Operating Snapshot Controller shall store operating inputs and outputs at time of alarm.

F. Submittals

1. Product Data: For each type or model include the following:

a. Complete fan performance curves for Supply Air.

b. Sound performance data for Supply Air.

c. Motor ratings, electrical characteristics, motor and fan accessories.

d. Performance ratings for all coils.

e. Dimensioned drawings for each type of installation to include location of attached ductwork and service clearance requirements.

f. Estimated gross weight of each installed unit.

g. Installation, Operation and Maintenance manual (IOM) for each model.

h. Microprocessor Controller (DDC) specifications to include available options and operating protocols. Include complete data on all factory-supplied input devices. Modbus RTU and BACnet IP are standard protocols. They must be compatible with LG AC Smart Controller.

G. Examination

1. Prior to start of installation, examine area and conditions to verify correct location for compliance with installation tolerances and other conditions affecting unit performance. See unit IOM.

2. Examine roughing-in of plumbing, electrical and HVAC services to verify actual location and compliance with unit requirements. See unit IOM.

3. Proceed with installation only after all unsatisfactory conditions have been corrected.

H. Installation

1. 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.

I. Coordination

1. Coordinate size and location of all building penetrations required for installation of each unit and associated plumbing and electrical systems.

2. Coordinate location of water system fittings to ensure correct positioning for condensate drain pipe.

3. Coordinate sequencing of construction of associated plumbing, HVAC, electrical supply and sheet metal contractor.

J. Quality Assurance

1. Source Limitations: Obtain unit with all appurtenant components or accessories from a single manufacturer.

2. For the actual fabrication, installations, and testing of work under this section, use only thoroughly trained and experienced workers completely familiar with the items required and with the manufacturer's current recommended methods of installation.

3. Product Options: Drawings must indicate size, profiles, and dimensional requirements and are to be based on the specific system indicated. Refer to Division 1 Section "Product Requirements".

4. Certifications

a. Blower shall be AMCA Certified for airflow.

b. Entire unit shall be ETL Certified per U.L. 1995 and bear an ETL sticker.

K. Field Quality Control

1. Manufacturer's Field Service

a. Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections.

2. Reports results to A/E in writing

a. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

END OF SECTION 230220

SECTION 230235 – ENERGY RECOVERY UNITS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 QUALITY ASSURANCE

A. Manufacturer's Qualification's:

1. Manufacturer regularly engaged, for past 5 years, in manufacture of air handling units of similar type to that specified.

2. ISO 9001 certified company

B. Installer's Qualifications:

1. Installer regularly engaged, for past 5 years, in installation of air handling units of similar type to that specified.

2. Employ persons trained for installation of air handling units.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.

2. Keep materials in manufacturer's original, unopened containers and packaging until installation.

3. Store materials in clean, dry area indoors.

4. Protect materials during storage, handling, and installation to prevent damage.

PART 2 - PRODUCTS

2.1 ENERGY RECOVERY VENTILATORS

A. Energy Recovery Ventilators: "Topvex FR Series" or approved equal.

1. Indoor, compact, commercial, air handling units.
2. Re-Heat Coil: [Hot Water]
3. Airflow Control: Constant air volume.

B. General:

1. Each Unit or Group of Units: Capable of operating in any mode independently or dependently of other systems.
2. Capable of changing modes with no interruption to system operation.
3. Listed under CSA C22.2, No. 113/UL 1812.
4. Wiring: NFPA 70.
5. Performance: As scheduled on the Drawings.
6. Equip with control systems.
7. Perform all functions necessary for operation.
8. Ventilation to Building: Not to cease in any mode based solely on operational temperature of minus 13 to 104 degrees F (minus 25 to 40 degrees C.)
9. Surrounding Sound Power Rating: Not higher than 75 dB(A).
10. Sound Data: Measured in accordance with AMCA 300.
11. Capable of operating at normal condition with specific fan power (SFP) lower than 0.9 W/cfm (2.35 kW/m^3/s).
12. Capable of operating in winter and summer conditions without imbalance or loss of ventilation capacity greater than specified in design.

C. Unit Cabinet:

1. Cabinet Exterior: 20-gauge sheet steel, ASTM A 792/A 792M, 55 percent aluminum-zinc alloy coating with corrosion protection rated Class III.
2. Double-Wall Cabinet Interior:
   a. 20-gauge sheet galvanized steel, G90.
   b. Seams: Sealed, requiring no caulking in field.
3. Insulation within Double Wall:
   a. 1.5-inch (38-mm) fiberglass.
   b. Flame Spread Index, UL 723: Not over 25.
   c. Smoke Developed Index, UL 723: Not over 50.
4. Provisions for field installed pre-heater system.

D. Fans:

1. Direct-drive, backward-inclined, motorized impellers.
2. Fan Motors:
   a. Maintenance-free, permanently lubricated, sealed ball bearings.
   b. Thermal overload protected (TOP).
   c. UL listed to UL 1004-1, 1004-2, 1004-3, 1004-7 and/or UL 2111; CSA C22.2, No. 77 and No. 100.
   d. IP Protection: Class 44 or 54.
   e. Electronically commutated “EC” to maximize efficiency at different speeds.
   f. Mounted for quiet operation.
3. Separate fans for exhaust and supply blowers.

E. Energy Recovery Wheel:

1. Direct-drive, backward-inclined, motorized impelle Rotor Matrix: Corrosion-resistant aluminum alloy, composed of alternating corrugated and flat, continuously wound layers of uniform width that guarantee laminar air flow and low static pressure loss.
2. Counter-flow construction type.
3. Free cooling capacity.
4. Performance: Certified and listed by AHRI.
5. Rotor Wheel: 8-inch-thick wheel welded at hub and perimeter to prevent uneven run-out during normal operations.
6. Corrugated Surfaces: Coated with thin, non-migrating, adsorbent, Zeolite particles.
7. Effectiveness of Wheel: Documented in accordance with ASHRAE 84 and AHRI 1060.
8. Flame Spread Index, Energy Recovery Wheel, UL 723: Not over 25.
9. Smoke Developed Index, Energy Recovery Wheel, UL 723: Not over 50.

F. Air Filters:

1. Fresh air protected by MERV13 pockets filter constructed to meet UL 900.
2. Exhaust air protected by MERV9 pockets filter constructed to meet UL 900.
3. Individual Pockets: Assembled into galvanized steel header providing rigid support to filter.
4. Pre-heated air protected by stranded aluminum mesh, not shedding or affected by humidity.
5. Adjustable Monitoring System: Activates alarm through main controller when pressure drop increase through supply or exhaust filters.

G. Temperature Sensors: Four stainless steel temperature sensors for monitoring supply and exhaust air in and air out, maximizing units efficiency and detecting need for frost prevention.

H. Hot Water Coil:

1. Aluminum plate fins on copper tubing.
2. Heat Control: Operated by 0 to 10 V signal activated by unit's main controller.
3. Frost Protection Sensor: Activates alarm if frost occurs.

I. Electrical 3 Phase Input Voltage:

1. Electrical Power: 208-230 VAC, 3 phase, 60 Hz with neutralline.
2. Internal Electrical Components: Factory wired for single-point power connection.
3. Electrical Box Components: Accessible without stopping unit or opening doors.
4. Electrical Box:
   a. Isolated from airflow paths.
   b. Protect integral wires and connections.
5. Controlled by integral microprocess or controller.

J. Serviceability:

1. Access Panel: Hinged and/or screwed access panel on bottom of unit.
2. Sliding Door System: Minimize clearance required for doors during maintenance.
3. Energy Recovery Wheels, Filters, and Motors: Serviceable from front of unit.
4. Fan Assemblies: Mounted on removable base.
5. Energy Recovery Wheels and Filters: Mounted on slide-out rails.

2.2 CONTROLS

A. General:

1. Corrigo: Capable of supporting remote controllers, schedule timers, system controllers, centralized controllers integrated web-based interface, graphical user workstation, and system integration to Building Management System via Native BacNET, Modbus via RS 485, Exoline, built-in web, and TCP/IP.
2. Digital wall controller display.
3. Digital wall controller display.
4. Control Wiring: Installed in system daisy-chain configuration from unit to BAS controller and to other units, if applicable.
5. Control Wiring: Installed in system daisy-chain configuration from unit to BAS controller and to other units, if applicable.

B. Integration with Building Management Systems:

1. Corrigo in EXO4 System: Equipped with RS485 port for bus communication via EXOline or Modbus. Enables controller to be directly integrated with EXO4, Regin SCADA system.
2. Corrigo Web in a network.
3. Corrigo directly integrated with foreign SCADA system via Modbus.
4. Corrigo integrated with foreign SCADA system via Regin EXOopc Driver.
5. Corrigo Connected to Foreign Protocols:
   a. Controller: Handle BACnet, Johnson, Trend, and other foreign protocols via EXO communicator.
6. Controller: Handle BACnet, Johnson, Trend, and other foreign protocols via EXO communicator.
7. Schedule Timer:
   a. Corrigo: Year-base clock function. Weekly schedule with holiday periods for full year can be set.

   b. Clock:
      i. Automatic summertime/wintertime change-over, individual schedules for each weekday, and separate holiday setting.
      ii. Up to 24 individual holiday periods configurable.
      iii. Holiday Period: Anything from 1 day up to 365 days.
      iv. Holiday Schedules: Take precedence over other schedules.
      v. Each Day: Up to 2 individual running periods.
   c. Pressure Controlled Fans: Daily individual schedules for normal speed and reduced speed, each with up to 2 running periods.
   d. Up to 5 digital outputs available as timer-controlled outputs. Each with individual week schedules with 2 activation periods per day.

C. Graphical User Workstation Software:

1. E-Tool: PC-based configuration software with graphical user interface.
2. Program: Overview of Corrigo E settings.
3. Using E Tool, all settings configured on PC and downloaded into controller.
4. Infinite number of configurations stored in computer memory for later use.

2.3 ASSEMBLY

A. Factory assembled and wire energy recovery ventilators.

2.4 ACCESSORIES

A. Hydronic Re-Heat: Model HWC.

B. Sliding Door Kit: Model SDF.

C. Shut-Off Damper: Model EFD and Model AF24 motor.

D. Fast Clamp 2-Piece Kit: Model FC.

E. Silencer for Circular Ducts: Model LD.

F. Corrigo Repeater: Model EO-R.

G. Temperature Sensor (minus 40 to 60 degrees C/IP65): Model TG-UH/PT1000.

H. 3-Way Valve with Actuator: Model B311B+TFRB24-SR-NC.

2.5 SOURCE

A. Runs test at factory.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and supporting structure to receive energy recovery ventilators.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

A. Prepare surfaces where energy recovery ventilators are to be mounted.

B. Ensure surfaces are flat, level, plumb, and can support weight of energy recovery ventilators.

3.3 INSTALLATION

A. Install energy recovery ventilators in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install energy recovery ventilators in accordance with NFPA 70.

C. Install energy recovery ventilators level, plumb, and secure.

D. Do not expose electronic components to temperatures below 32 degrees F (0 degrees C) or above 122 degrees F (50 degrees C).

E. Install duct configuration horizontal from top of unit to minimize height of installation.

3.4 ADJUSTING

A. Adjust energy recovery ventilators for proper operation in accordance with manufacturer's instructions.

3.5 DEMONSTRATION

A. Demonstration:

1. Demonstrate that the energy recovery ventilators function properly in every respect.

2. Perform demonstration at final system inspection by factory-trained and certified representative of manufacturer.

B. Instruction and Training:

1. Provide instruction and training of Owner's personnel as required for operation and maintenance of energy recovery ventilators.

2. Provide hands-on demonstrations of operation of system components and complete system, including user-level program changes and functions.

3. Provide instruction and training by factory-trained and certified representative of manufacturer.

3.6 PROTECTION

A. Protect installed energy recovery ventilators from damage during construction.

END OF SECTION 230235

SECTION 230250 – PACKAGED ROOFTOP UNITS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 SYSTEM DESCRIPTION

A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic, suction gas cooled, direct drive compressor(s) for cooling duty and for heating duty, or for cooling duty only with hot gas reheat.

B. Factory assembled, single- piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start- up.

C. Unit shall use environmentally sound, R-410A refrigerant.

D. Unit shall be installed in accordance with the manufacturer’s instructions.

E. Unit must be selected and installed in compliance with local, state, and federal codes.

1.2 QUALITY ASSURANCE

A. Unit meets ASHRAE 90.1 minimum efficiency requirements.

B. Unit shall be rated in accordance with AHRI Standards 210/240 or 340/360.

C. Unit shall be designed to conform to ASHRAE 15.

D. Unit shall be CSA tested and certified in accordance with ANSI Z21.47 -2016/CSA 2.3-2016, and CSA C22.2 No. 60335-2-40.

E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

F. Unit casing shall be capable of withstanding 750- hour salt spray exposure per ASTM B117 (scribed specimen).

G. Roof curb shall be designed to conform to NRCA Standards.

H. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory and must be available upon request.

I. Unit shall be designed in accordance with CSA C.22.2 NO.60335-2-40, including tested to withstand rain.

J. Unit shall be constructed to prevent intrusion of snow into the control box.

K. Units shall be shake tested to Truck 2, ASTM D4169 to ensure shipping reliability.

1.3 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled per manufacturer's recommendations.

B. Overhead crane can be used to place the units on a roof using rigging holes built into the unit base rails without any additions to the unit.

C. Unit shall only be stored or positioned in the upright position.

PART 2 - PRODUCTS

2.1 INSULATION

A. Evaporator fan compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.

2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

B. Economizer and Control compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.

2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

C. Partition and Duct Panel:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

E. Base Pan and Blower Back:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, foil faced fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.

2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

2.2 INSTRUMENTATION AND CONTROL DEVICES

A. Thermostats

1. Thermostats must:
   a. Energize “Y” when calling for cooling and “W” when calling for heating.
   b. Shall have capability to energize 2 different stages of cooling, and 2 different stages of heating.
   c. Shall have capability to energize 4 different stages of cooling and 2 different stages of heating.
   d. Shall include capability for occupancy scheduling.

2.3 DIRECT-DIGITAL CONTROLSYSTEM

A. Simplicity SMART Equipment Control

1. Shall be ASHRAE 62 complaint.

2. Shall accept 20-30 VAC input power, 50/60Hz. 24 VAC nominal.

3. Shall have an operating temperature range from -40°F to 158°F; 10-90% RH (non-condensing UI), and -4°F to 158°F; 10-90% RH (non-condensing), with a storage temperature range from -40°F to 194°F; 5-95% RH (non-condensing).

4. Shall include an option of an Economizer microprocessor controller which communicates directly with the Unit Control Board and has 8 Analog outputs, 2 Analog inputs, 2 Binary outputs, 3 Binary inputs.

5. Controller shall accept the following inputs: space temperature, return air temperature sensor, set point adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock- out, fire/smoke shutdown, single and dual enthalpy, fan status, remote time clock, Sensor Actuator (SA) Bus communicated temperature/humidity/CO2 values from Network sensors, Field Controller (FC) Bus Network Overrides for space temperature, outdoor air temperature, space humidity, outdoor air quality, Indoor air quality, System purge.

6. Shall accept a CO2 sensor or multiple CO2 sensors networked together in the conditioned space and be Demand Control Ventilation (DCV) ready.

7. Shall provide compressor short-cycle protection with minimum compressor runtime set at 3 minutes standard and adjustable from 2 to 7 minutes.

8. Unit shall provide surge protection for the controller through a circuit breaker.

9. Shall have open communication protocols with all required points exposed. Protocols supported include: BACnet®, MS/TP, Modbus®, and N2 communication.

10. Shall have an LCD display on the Unit Control Board to display fault messages as well as navigate the menu structure to review and change set points.

11. Shall utilize a USB connection to allow for uploading and downloading of data.

    a. USB shall allow for downloading of “trending data” for analysis of inputs and values on other device such as a PC.

b. USB shall allow for uploading of new firmware to the UCB.
c. USB shall allow for backing up controller set points and parameters and for uploading of these same parameters to the UCB.

12. Shall include an RJ-12 port to be used with a Wi-Fi signal transmitting device and allow unit(s) access via any non-proprietary smart device.

    a. Unit access shall include ability to view and change all adjustable parameters and set points using the same characteristics and values available directly through the UCB joystick and LCD display.
    b. Unit access shall be configurable at 3 different levels to allow control over parameter and set point changes.
    c. Wi-Fi transmitting device can be connected by 3 means.

        i. RJ-12 port connected directly to UCB.
        ii. Optional connection port mounted in operating space.
        iii. Optional connection to building network allowing unit access from any internet browser worldwide.

13. Shall have the capability to integrate with Verasys zoning controls system.

14. Shall not require any proprietary software or contractor tool to start-up, commission and troubleshoot unit operation.

15. Software upgrades will be accomplished by local download via USB port on main Unit Control Board.

16. Shall be UL Recognized, File E107041, UL 916, Energy management Equipment, UL 60335-2-40, Heating and Cooling Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class B, CSA 22.2 No. 236, Signal Equipment Industry Canada, ICES-003 Recognized, and BTL certified.

2.4 ELECTRIC AND ELECTRONIC CONTROL SYSTEM

A. General:

1. Shall be complete with self- contained low- voltage control circuit protected by a resettable circuit breaker on the 24- v transformer side. Transformer shall have minimum 75VA capability.

2. Shall utilize color- coded wiring.

3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, DDC control options, and low and high pressure switches.

B. Safeties:

1. Compressor over- temperature and over- current.

2. Low pressure switch and high pressure switch.

a. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

3. Automatic reset, motor thermal overload protector.

2.5 PANEL AIR FILTERS

A. Standard Filter Section

1. Shall consist of factory installed, low velocity, disposable 2- in. thick fiberglass filters of commercially available sizes.

2. Units can accept 2” or 4” filters and have a field convertible transition.
3. Filters shall be accessible through an access panel; hinged panel with toolless access is available as described in the Special Features Options and Accessories section of this specification.

2.6 OPERATING CHARACTERISTICS

A. General

1. Unit shall be capable of starting and running at 115°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at + 10% voltage.

2. Compressor with standard controls shall be capable of operation down to 45°F (7°C), ambient outdoor temperatures. Intermittent cooling shall be operational down 0° F (-17° C). Low ambient kit is necessary if mechanically cooling at ambient temperatures below 40°F (4°C).

3. Unit shall be factory configured for vertical supply & return configurations.

B. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

C. Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 750 hour salt spray test per ASTM-B117 standards.

2. Unit cabinet exterior paint shall be: film thickness, (dry) 3.0 MILS minimum, gloss (per ASTM D523, 60°F / 16°C): 80+/-5, Hardness: H- 2H Pencil hardness.

3. Unit cabinet shall have gas utility entry holes in the side of the unit and in the unit underside. Entry holes shall not require field setup and shall be capped from the factory to prevent water intrusion when not in use.

4. Unit cabinet shall have electric utility entry locations marked from the factory with a dimple for accuracy of field drilling. Entry locations shall be available for entry through the side of the unit or from the unit underside.

5. Base Rail

   a. Unit shall have base rails on all 4 sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the unit by fork truck.
   d. Base rail shall be a minimum of 15 gauge thickness.

6. Condensate pan and connections:

   a. Shall be a multidirectional internally sloped condensate drain pan made of a non- corrosive material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 1” NPT female drain connection through the side of the drain pan. Connection shall be made per manufacturer’s recommendations.
   d. Shall include intentional “overflow notch” and water containment path to guide flow of water where desired in the event of a drain pan overflow.

7. Top panel:

   a. Shall be a multi piece top panel.

8. Electrical Connections

   a. All unit power wiring shall enter unit cabinet through a field drilled hole located by a factory provided dimple.
   b. Through- the- base capability.

      i. Standard unit shall have a through- the- base electrical location(s) using a raised, embossed portion of the unit base-pan.
      ii. No base-pan penetration, other than those authorized by the manufacturer, is permitted.

D. Coils

1. Evaporator Coils, Aluminum Fin - Copper Tube:

   a. Standard evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.

b. Shall be leak tested to 150 psig, pressure tested to 250 psig, and burst qualified to CSA C22.2 No. 60335-2-40.
c. Assembled unit shall be pressure tested to 450 psig.

2. Condenser Coils, All Aluminum Microchannel:

a. Condenser coils shall have all aluminum microchannel design consisting of aluminum multiport flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.
b. Microchannel condenser coils shall be leak tested to 150 psig, pressure tested by supplier to 600 psig, and burst qualified to CSA C22.2 No. 60335-2-40.
c. Assembled unit shall be pressure tested to 450 psig.

3. E-Coated Evaporator and/ or Condenser Coils:

a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
c. Color shall be high gloss black with gloss per ASTM D523- 89.
d. Uniform dry film thickness from 0.6 to 1.2 mil on all surface areas including fin edges.
e. Superior hardness characteristics of 2H per ASTM 3363-00 and cross-hatch adhesion of 4B- 5B per ASTM D3359- 97.
f. Impact resistance shall be 160 in.- lb. (ASTM D2794- 93).
g. Humidity and water immersion resistance shall be a minimum of 1000 hours (ASTM D2247- 99 and ASTM D870- 02).
h. Corrosion durability shall be confirmed through testing to exceed 6000 hours salt spray per ASTM B117- 97.

E. Refrigerant Circuits

1. Constant Volume and 2 stage IntelliSpeed airflow options shall have 2 refrigerant circuits with 2 stages of cooling.
2. 4 stage IntelliSpeed and Variable Air Volume airflow options shall have 2 independent refrigerant circuits with 4 stages of cooling.
3. Refrigerant circuit shall include the following control, safety, and maintenance features:

a. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range.
b. Refrigerant filter drier - Solid core design.
c. Service gauge connections on suction and discharge lines.

4. Compressors

a. Unit shall use fully hermetic scroll compressors for each independent refrigeration circuit.

b. Two stage models shall use a single stage compressor on each refrigeration circuit.
c. Four stage models that are 15, 17.5, or 20 tons shall use a two stage compressor on circuit one and a single stage compressor on circuit two.
d. Four stage models that are 25 or 27.5 tons shall use a tandem compressor set on circuit one and a single stage compressor on circuit two.
e. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
f. Compressors shall be internally protected from high discharge temperature conditions.
g. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
h. Compressor shall be factory mounted on rubber grommets.
i. Crankcase heaters shall be installed in the factory as needed on tandem compressor sets.

F. Evaporator Fan and Motor

1. Evaporator Fan Motor:

a. Shall have permanently lubricated ball-bearings.
b. Shall have inherent automatic- reset thermal overload protection.
c. The job site selected brake horsepower shall be required to not exceed the motor's nameplate horsepower rating plus the service factor.

2. Evaporator Fan:

a. Fan shall be a belt drive assembly with an adjustable pitch motor pulley.
b. Blower bearings shall have an L10 life of 100,000 hrs.
c. Shall use sealed, permanently lubricated ball-bearing type.
d. Shall use dual blower design consisting of two balanced blower fans on a single shaft.
e. Blower fan shall be double- inlet type with forward- curved blades.
f. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

G. Condenser Fans and Motors

1. Condenser fan motors:

a. Shall be a totally enclosed motor.
b. Shall use permanently lubricated ball-bearings.
c. Shall have inherent thermal overload protection with an automatic reset feature.
d. Shall use a shaft- down design.

2. Condenser Fans:

a. Shall be a direct- driven propeller type fan.

H. Special Features Options and Accessories

1. Intelli*Speed* staged air volume system:

a. Evaporator fan motor:

i. Shall have permanently lubricated bearings.
ii. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
iii. Shall be Variable Frequency duty and multi-speed control.

2. Variable Frequency Drive (VFD). Available on multi-speed (IntelliSpeed) and VAV indoor fan motor options:

a. Shall be installed inside the unit cabinet, mounted, wired and tested.
b. Shall contain Electromagnetic Interference (EMI) frequency protection.
c. Insulated Gate Bi- Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform.
d. Built in LED display and controls. Does not require additional kit or options.
e. RS485 capability standard.
f. Electronic thermal overload protection.
g. All printed circuit boards shall be conformal coated.

3. Low Leak Economizer:

a. Integrated, tie-bar driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
b. Damper blades shall be galvanized steel with tie-bar metal linkages. Plastic or composite blades on intake or return shall not be acceptable.
c. Damper blades shall be class 1A dampers.
d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below set points.
e. Shall be equipped with tie-bar driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
f. Economizer shall comply with, and be certified to, the AMCA 511 standard.
g. Standard leak rate shall be equipped with dampers not to exceed 3 cfm/ft2 leakage at 1 in. wg pressure differential.
h. Economizer controller shall be the Johnson Controls SE Economizer Controller.

i. On- board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, meets the requirements for California Title 24, IECC 2015, and ASHRAE 90.1.
ii. Display alarms if the following occur
- Economizer is economizing when conditions do not support
- Economizer is not economizing when conditions do support

- Damper Stuck
- Excess Outdoor Air
- Failed Sensor

iii. Automatic sensor detection
iv. Capabilities for use with multiple- speed indoor fan systems
v. Utilize digital sensors: Dry bulb and Enthalpy
vi. UL, CSA, and ICES-003 recognized and FCC compliant to CFR47

i. Shall be capable of introducing up to 100% outdoor air.
j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements. Barometric relief can be replaced by optional power exhaust.
k. Shall be designed to close damper(s) during loss- of- power situations with spring return built into motor.
l. Dry bulb outdoor air temperature sensor shall be provided as standard. Single or dual enthalpy sensing is available as a factory or field installed sensing option. Outdoor air sensor set point shall be adjustable and shall range from 40° to 80°F / 4° to 27°C. Additional sensor options shall be available as accessories.
m. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
o. Dampers shall be completely closed when the unit is in the unoccupied mode.
p. Economizer controller shall accept a 2- 10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
q. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

4. Barometric Relief Damper:

a. Shall contain all materials necessary to field install a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.

5. Motorized Damper:

a. Damper shall be a Two- Position Damper. Damper travel shall be from the full closed position to the full open position, depending on model selected.
b. Assembly shall include adjustable block off to allow air entry of 0% to 25% or 0% to 100% (dependent on selected option) of maximum allowed outside air.
c. Damper shall include multiple blades, tie-bar driven dampers and actuator motor.
d. Damper shall close upon indoor (evaporator) fan shutoff and/or loss

of power.

e. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.

f. Outside air hood shall include aluminum water entrainment filter.

6. Manual Damper:

a. Damper shall be a manually adjustable design.

b. Assembly shall include adjustable block off to allow air entry of 0% to 25% or 0% to 100% (dependent on selected option) of maximum allowed outside air.

c. Outside air hood shall include aluminum water entrainment filter.

7. MagnaDry Dehumidification System:

a. The MagnaDry Dehumidification system is factory installed and provides dehumidification of an occupied space while maintaining temperature control utilizing a hot gas reheat coil.

i. Determination of unit functionality in straight cooling, straight heating, or reheat mode shall come from standard SSE control board.

ii. Reheat mode shall utilize a specific reheat coil placed after the evaporator coil to heat the conditioned air back to a neutral temperature when the occupied space requires dehumidification, but the temperature requirements are satisfied.

iii. The reheat circuit shall utilize a 3-way electronic controlled valve to modulate the refrigerant between the condenser circuit and reheat circuit.

iv. Changeover from cooling mode to reheat mode shall be accomplished in 30 seconds or less.

8. Phase Monitor:

a. Shall provide protection against phase reversal, phase loss, and phase unbalance.

b. Switch shall automatically shut off unit control circuit if any of the above conditions is detected.

c. Shall have visual LED indication of operational status.

9. Hinged and toolless access panels:

a. Cabinet panels shall be hinged

b. Shall provide easy access with toolless latching mechanism

c. Shall be on major panels of: filter, control box, fan motor, and gas or electric heat controls.

10. Louvered Hail/Coil Guard:

a. Shall cover all external sides of unit condenser coil to prevent damage or tampering.

b. Field kit shall contain all materials necessary to field install a coil guard.

c. Shall provide protection for the coil and header on the entire exposed surfaces of the outdoor coil.

11. Unit- Mounted, Non- Fused Disconnect Switch:
    a. Switch shall be factory installed, internally mounted.
    b. National Electric Code (NEC) and UL approved non- fused switch shall provide unit power shutoff.
    c. Shall be accessible from outside the unit.
    d. Shall provide local shutdown and lockout capability.

12. Unit Mounted Circuit Breaker:
    a. Breaker shall be factory installed, internally mounted.
    b. National Electric Code (NEC) and UL approved circuit breaker shall provide unit power shutoff and protect the unit in the event of a short-circuit.
    c. Shall be accessible from outside the unit.
    d. Shall provide local shutdown and lockout capability.

13. Powered Convenience Outlet:
    a Outlet shall be powered from main line power to the rooftop unit.
    b. Outlet shall be factory installed and internally mounted with easily accessible 115- v female receptacle.
    c. Outlet shall include 15 amp GFI receptacles with independent fuse protection.
    d. Voltage required to operate convenience outlet shall be provided by a factory installed step- down transformer.
    e. Outlet shall be accessible from outside the unit.

14. Roof Curbs:
    a. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.

    b. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.

15. Dual Enthalpy Sensor:
    a. The dual enthalpy sensor option or kit shall provide 2 relative humidity sensors to be mounted in the return and outdoor air streams to provide dual enthalpy economizer control.
    b. This kit contains all components required to dual enthalpy and does not need to be used in conjunction with the Single Enthalpy Senor Kit.

16. CO_2 Sensor:
    a. Shall be able to provide demand ventilation control for indoor air quality (IAQ).
    b. The CO_2 sensor shall be available in duct mount or wall mount with LED display.
    c. The set-points for IAQ and OAQ shall have adjustment capability between 0 and 5000 ppm in the Simplicity Smart Equipment controls.

17. Smoke Detectors:

    a. Shall be a Four- Wire Controller and Detector.
    b. Shall be environmental compensated with differential sensing for reliable, stable, and drift- free sensitivity.
    c. Shall use magnet- activated test/reset sensor switches.
    d. Shall have a recessed momentary switch for testing and resetting the detector.
    e. Controller shall include:
        i. One set of normally open alarm initiation contacts for connection to an initiating device circuit on afire alarm control panel.
        ii. Two Form- C auxiliary alarm relays for interface with rooftop unit or other equipment.
        iii. One Form- C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
        iv. Capable of direct connection to two individual detector modules.
        v. Can be wired to up to 49 other duct smoke detectors for multiple fan shutdown applications.

18. Low Ambient Kit:

    a. Shall contain an integrated low ambient controller to regulate condenser head pressure at low ambient temperatures by varying the amount of airflow through the condenser.
    b. 15 and 17.5 ton models shall have a single controller while 20, 25, and 27.5 ton models shall have 2 controllers.
    c. Shall allow units to operate in cooling mode down to 0° F outdoor ambient.
    d. Shall be required when full mechanical cooling is required at temperatures below 40° F.

19. Condensate Overflow Switch:

    a. Shall utilize float switch in condensate drain pan to signal if water level rises above acceptable threshold.
    b. Switch shall detect a 0.25-inch rise above mounted location to determine need to send shutoff signal.
    c. Shall send 24V signal to unit controller when tripped to shut down cooling operation and prevent additional buildup of water in condensate drain pan.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230250

SECTION 230265 - VARIABLE REFRIGERANT FLOW INDOOR UNITS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 SYSTEM DESCRIPTION

A. Indoor units are matched with heat pump or heat recovery VRF (Variable Refrigerant Flow) outdoor unit.

1.2 DELIVERY, STORAGE AND HANDLING

A. Units shall be stored and handled per unit manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 CEILING CASSETTE UNITS

A. General
1. Unit shall be manufactured by LG approved or equal.
2. Unit shall be designed to be installed for indoor application.
3. Unit shall be designed to mount recessed in the ceiling and has a surface mounted grille with air inlet and outlet on the bottom of the unit.
4. The unit shall be available in both nominal 2’ x 2’ and 3’ x 3’ chassis.

B. Casing/Panel

1. Unit case shall be manufactured using galvanized steel plate.
2. The unit panel shall be provided with an off-white or black Acrylonitrile Butadiene Styrene (ABS) polymeric resin grille.
3. The grille shall have a tapered trim edge, and a hinged, spring clip (screw-less) return air filter-grille door.
4. Unit shall be provided with metal ears designed to support the unit weight on four corners.
5. Ears shall have pre-punched holes designed to accept field supplied all thread rod hangers.
6. Unit shall be supplied with snap off access panels to facilitate leveling of unit without removing the grille.

C. Cabinet Assembly

1. Unit shall have one, two- or four-way supply air outlets and one return air inlet.
2. The supply air outlet shall be through directional slot diffusers each equipped with independent oscillating motorized guide vanes designed to change the airflow direction.
3. The grille shall have a discharge range of motion of 40° in an up/down direction with capabilities of locking the vanes. The unit shall be provided with a factory perforated knockout for ventilation air.

4. Unit shall have factory installed motorized louver to provide flow of air in up and down direction for uniform airflow. The unit shall have a guide vane algorithm designed to sequentially change the predominant discharge airflow direction in counterclockwise pattern.
5. Guide vanes shall provide airflow in all directions.
6. Unit shall be equipped with factory installed temperature thermistors for:
   a. Return air
   b. Refrigerant entering coil
   c. Refrigerant leaving coil
7. Unit shall have a factory assembled, piped and wired electronic expansion valve (EEV) for refrigerant control.
8. Unit shall have a built-in control panel to communicate with other indoor units and to the outdoor unit.
9. The unit shall have factory designated branch duct knockouts on the unit case.
10. The unit shall have provision of fresh air ventilation through a knock-out on the cabinet.
11. The branch duct knockouts shall have the ability to duct up to 1/2 the unit airflow capacity.
12. The branch duct cannot be ducted to another room.
13. Unit shall have the following functions as standard:

    a. Self-diagnostic function
    b. Auto addressing
    c. Auto restart function
    d. Auto changeover function (Heat Recovery system only)
    e. Auto operation function
    f. Child lock function
    g. Forced operation
    h. Dual thermistor control
    i. Sleep mode
    j. Dual set point control
    k. Multiple aux heater applications**>**
    l. Filter life timer
    m. External on/off input
    n. Wi-Fi compatible
    o. Auto fan operation
    p. Leak detection logic

D. Fan Assembly

1. The unit shall have a single, direct driven, crossflow tangential Sirocco fan made of high strength ABS GP-2305 polymeric resin. The unit shall have a single, direct-drive turbo fan made of high strength ABS HT-700 polymeric resin.
2. The fan impeller shall be statically and dynamically balanced.
3. The fan motor is Brushless Digitally commutated (BLDC) with permanently lubricated and sealed ball bearings.
4. The fan motor shall include thermal, overcurrent and low RPM protection.
5. The fan/motor assembly shall be mounted on vibration attenuating rubber grommets.

6. The fan speed shall be controlled using microprocessor based direct digitally controlled algorithm that provides a minimum of four pre-programed fan speeds in the heating mode and fan only mode and five speeds in the cooling mode. The fan speed algorithm provides a field selectable fixed speed. Each setting is also adjustable by field setting to compensate for a limited amount of additional resistance to airflow by adjusting the RPM of the fan motor.
7. A field setting shall be provided to vary air throw pattern to compensate for high ceiling installations.
8. In cooling mode, the indoor fan shall have the following settings: Low, Med, High, Super high**>**, Power Cool, and Auto.
9. In heating mode, the indoor fan shall have the following settings: Low, Med, High, Super high**>** and Auto.
10. Unit shall have factory installed motorized louver to provide flow of air in up and down direction for uniform airflow.

E. Filter Assembly

1. The return air inlet shall have a factory supplied removable, washable filter.
2. The unit shall have the capability to accept a field provided MERV 1 to MERV 10 filter.
3. The filter access shall be from the bottom of the unit without the need for tools.
4. The nominal 3'x3' cabinet unit shall have provision for an optional auto-elevating grille kit designed to provide motorized ascent/descent of the return air grille/pre filter assembly.
    a. The ascent/descent of the return air grille shall be up to a distance of 14-3/4 feet allowing access to remove and clean the filter.
    b. The auto-elevating grille shall have a control algorithm to accept up, down and stop control commands from the controller.
    c. The auto-elevating grille shall have a control to stop the descent automatically if a contact is made with any obstacle.

F. Coil Assembly

1. Unit shall have a factory built coil comprised of aluminum fins mechanically bonded on copper tubing.
2. The copper tubing shall have inner grooves to expand the refrigerant contact surface for high efficiency heat exchanger operation.
3. Unit shall have a minimum one or two row coil, 18-19 fins per inch.
4. Unit shall have a factory supplied condensate drain pan below the coil constructed of EPS (expandable polystyrene resin).
5. Unit shall include an installed and wired condensate drain lift pump capable of providing minimum 27.5 inch lift from bottom surface of the unit.
6. Unit shall have a 1.0" ID factory insulated drain hose to handle condensate.**>**
7. The drain pump shall have a safety switch to shut off the unit if condensate rises too high in the drain pan.
8. Unit shall have provision of 45° flare refrigerant pipe connections.
9. The coil shall be factory pressure tested at a minimum of 550 psig.
10. All refrigerant piping from outdoor unit to indoor unit shall be field insulated. Each pipe should be insulated separately. Thickness and heat transfer characteristics shall be determined by the design engineer and shall meet all code requirements.

G. Microprocessor Control

1. The unit shall have a factory installed microprocessor controller capable of performing functions necessary to operate the system with or without the use of a wall mounted controller. The unit shall have a factory mounted return air thermistor for use as a space temperature control device. All operating parameters except scheduling shall be stored in non-volatile memory resident on the microprocessor. The microprocessor shall provide the following functions, self-diagnostics, auto re-start after a power failure and a test run mode.
2. The unit shall be able to communicate with other indoor units and the outdoor unit using a field supplied minimum of 18 AWG, two core, stranded, twisted and shielded communication cable.
3. The unit controls shall operate the indoor unit using one of the five operating modes:
   a. Auto changeover (Heat Recovery System only)
   b. Heating
   c. Cooling
   d. Dry
   e. Fan only
4. The unit shall be able to operate in either cooling or heating mode for testing and/or commissioning.
5. The unit shall be able to operate with the fan turned off during system cooling thermal off.
6. The unit shall have adjustable, multi-step cooling and heating mode thermal on/off temperature range settings.
7. The system shall include a product check function to access and display indoor unit type and capacity from a wired programmable thermostat controller.
8. Unit shall have a field settable method to choose auto fan speed change operation based on mode of operation, on/off fan operation based on mode of operation, or continuous minimum set fan speed operation.

H. Electrical

1. The unit electrical power shall be 208-230/1/60 (V/Ph/Hz).
2. The unit shall be capable of operating within voltage limits of +/- 10% of the rated voltage.

I. Controls

1. Unit shall use controls provided by the manufacturer to perform all functions necessary to operate the system effectively and efficiently and communicate with the outdoor unit over an RS-485 daisy chain.

J. Seismic Installations

1. Provide OSHPD Special Seismic Certification Preapproval (OSP) documents for certified product list of VRF equipment to be installed in high seismic risk areas. Provide LG supplemental installation documents in conformance with CBC 2013, 2016 and 2019 California Building Code and IBC 2012, 2015 and 2018 International Building Code.

K. Warranty

1. Please refer to the respective outdoor unit for applicable warranty.

2.2 WALL MOUNTED – STANDARD

A. General

1. Unit shall be manufactured by LG.
2. Unit shall be designed to be installed for indoor application.
3. Unit shall be attached to an installation plate/bracket that secures unit to the wall.
4. The depth of the unit shall not exceed 8.25 inches.

B. Casing/Panel

1. Unit case shall be manufactured using Acrylonitrile Butadiene Styrene (ABS) polymeric resin and has a pearl white finish designed for mounting on a vertical surface and includes an installation mounting template and hanging bracket.

C. Cabinet Assembly

1. Unit shall have one supply air outlet and one return air inlet with a manual or motorized sweeping guide vane that automatically changes the direction of airflow from side-to-side and up-and-down.

2. Unit shall be equipped with factory installed temperature thermistors for:
   a. Return air
   b. Refrigerant entering coil
   c. Refrigerant leaving coil

3. Unit shall have a factory assembled, piped and wired electronic expansion valve (EEV) for refrigerant control.

4. Unit shall have a built-in control panel to communicate with other indoor units and to the outdoor unit.

5. Unit shall have the following functions as standard:
   a. Self-diagnostic function
   b. Auto addressing
   c. Auto restart function
   d. Auto changeover function (Heat Recovery system only)
   e. Auto operation function
   f. Auto clean function
   g. Child lock function
   h. Forced operation
   i. Dual thermistor control
   j. Sleep mode
   k. Dual set point control
   l. Filter life timer
   m. External on/off control input
   n. Wi-Fi compatible
   o. Auto fan operation
   p. Leak detection logic

6. Unit shall be capable of refrigerant piping in four different directions.
7. Unit shall be capable of drain piping in two different directions.

D. Fan Assembly

1. The unit shall have a single, direct driven crossflow tangential Sirocco fan made of high strength ABS BSN-7530 polymeric resin.
2. The fan impeller shall be statically and dynamically balanced.
3. The fan motor is Brushless Digitally commutated (BLDC) with permanently lubricated and sealed ball bearings.
4. The fan motor shall include thermal, overcurrent and low RPM protection.
5. The fan/motor assembly shall be mounted on vibration attenuating rubber grommets.
6. The fan speed shall be controlled using microprocessor based direct digitally controlled algorithm that provides a minimum of three pre-programed fan speeds in the heating mode and fan only mode and four speeds in the cooling mode. The fan speed algorithm provides a field selectable fixed speed.
7. In cooling mode, the indoor fan shall have the following settings: Low, Med, High, Power Cool, and Auto.
8. In heating mode, the indoor fan shall have the following settings: Low, Med, High, and Auto.
9. Unit shall have factory installed motorized louver to provide flow of air in up and down direction for uniform airflow.
10. Unit shall have factory installed motorized guide vane to control the direction of flow of air from side to side.

E. Filter Assembly

1. The return air inlet shall have a factory supplied removable, washable filter
2. The filter access shall be from the front of the unit without the need of tools.

F. Coil Assembly

1. Unit shall have a factory built coil comprised of aluminum fins mechanically bonded on copper tubing.
2. The copper tubing shall have inner grooves to expand the refrigerant contact surface for high efficiency heat exchanger operation.
3. Unit shall have a minimum two row coil, 18 fins per inch.
4. Unit shall have a factory supplied condensate drain pan below the coil constructed of EPS (expandable polystyrene resin).
5. Unit shall be designed for gravity drain.
6. Unit shall have a 5/8” inside diameter factory insulated drain hose to handle condensate.
7. Unit shall have provision of 45° flare refrigerant pipe connections.
8. The coil shall be factory pressure tested at a minimum of 550 psig.
9. All refrigerant piping from outdoor unit to indoor unit shall be field insulated. Each pipe should be insulated separately.
10. Thickness and heat transfer characteristics shall be determined by the design engineer and shall meet all code requirements.

G. Microprocessor Control

1. The unit shall have a factory installed microprocessor controller capable of performing functions necessary to operate the system with or without the use of a wall mounted zone controller. The unit shall have a factory mounted return air thermistor for use as a space temperature control device. All operating parameters except scheduling shall be stored in non-volatile memory resident on the microprocessor. The microprocessor shall provide the following functions, self-diagnostics, auto re-start after a power failure and a test run mode.
2. The unit shall be able to communicate with other indoor units and the outdoor unit using a field supplied minimum of 18 AWG, two core stranded, twisted, and shielded communication cable (RS-485).
3. The unit controls shall operate the indoor unit using one of the five operating modes:
   a. Auto changeover (Heat Recovery System only)
   b. Heating
   c. Cooling
   d. Dry
   e. Fan only
4. The unit shall be able to operate in either cooling or heating mode for testing and/or commissioning.
5. The unit shall be able to operate with the fan turned off during system cooling thermal off.
6. The unit shall have adjustable, multi-step cooling and heating mode thermal on/off temperature range settings.
7. The system shall include a product check function to access and display indoor unit type and capacity from a wired programmable thermostat controller.
8. Unit shall have a field settable method to choose auto fan speed change operation based on mode of operation, on/off fan operation based on mode of operation, or continuous minimum set fan speed operation.

H. Electrical

1. The unit electrical power shall be 208-230/1/60 (V/Ph./Hz).
2. The unit shall be capable of operating within voltage limits of +/- 10% of the rated voltage.

I. Controls

1. Unit shall use controls provided by the manufacturer to perform all functions necessary to operate the system effectively and efficiently and communicate with the outdoor unit over an RS485 daisy chain.

J. Seismic Installations

1. Provide OSHPD Special Seismic Certification Preapproval (OSP) documents for certified product list of VRF equipment to be installed in high seismic risk areas. Provide LG supplemental installation documents in conformance with CBC 2013, 2016 and 2019 California Building Code and IBC 2012, 2015 and 2018 International Building Code.

K. Limited Warranty

1. Please refer to the respective outdoor unit for applicable warranty.

2.3 BMS INTEGRATION:

A. The VRF system shall be able to integrate with Building Management Systems via BACnet™ IP gateway. This gateway converts between BACnet™ IP or Modbus TCP protocol, and RS-485 LGAP (LG Aircon protocol) allowing third party control and monitoring of the LG A/C system, or LonWorks™ gateways. See controls specification for points list.

PART 3 – EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230265

SECTION 230266 - VARIABLE REFRIGERANT FLOW OUTDOOR UNITS

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 SYSTEM DESCRIPTION

A. Indoor units or outdoor air handling units are matched with heat pump or heat recovery VRF (variable refrigerant flow) outdoor unit.

1.2 DELIVERY, STORAGE AND HANDLING

A. Unit shall be ETL listed and certified to UL 1995 4th edition standard.

PART 2 - PRODUCTS

2.1 HEAT RECOVERY AND HEAT PUMP SYSTEMS

A. Product Design

1. LG Multi V heating and cooling system shall be an air cooled system allowing user to configure in the field a heat pump or a heat recovery system consisting of one to three outdoor unit modules, conjoined to make a 2-5 ton single refrigerant circuit for the Multi V S system, and 6-42 single refrigerant circuit for the Multi V 5 system.

a. Heat recovery systems, employing three pipes, shall be connected to Heat recovery (heat recovery) unit(s) and indoor unit(s). Multi-port heat recovery units shall allow simultaneous heating and cooling of individual zone(s) at various capacities as required to satisfy their zone requirements.

b. Heat pump systems shall require two pipes, simultaneous heating and cooling shall not be supported. The heat recovery system shall consist of three pipes, liquid, suction and hot gas pipes. Heat recovery systems operating at 0°F that cannot deliver single phase superheated refrigerant vapor at a minimum of 162°F while operating in the heating mode shall not be acceptable.

2. All three-phase VRF heat pump and heat recovery outdoor units shall be from the same product development generation. Mixing of outdoor units from different development generations is not acceptable.

B. Operating Conditions

1. Outdoor Unit shall be capable of continuous compressor operation between the following operating ambient air conditions, operation outside of these conditions are possible and may involve non-ontinuous operations.

2. Operating Ambient Air Conditions

a. Cooling: 5°F DB to 122°F DB (With optional low ambient kit from -9.9°F DB to 122°F DB)
b. Heating: -22°F WB to 61°F WB
c. Cooling Based (ODU reversing valve in cooling position) Synchronous: 14°F DB to 81°F DB (Heat Recovery Operation Only)
d. Heating Based (ODU reversing valve in heating position) Synchronous: 14°F WB to 61°F WB (Heat Recovery Operation Only)

C. Electrical

1. All air source heat pump and heat recovery frame(s) shall be designed and electrically protected to maintain stable continuous compressor operation when provided with 460/60/3 or 208-230/60/3 power with the following specifications:

a. 460/60/3
   i. Voltage tolerance 414V
b. 208-230/60/3 power and can withstand a voltage fluctuation of ± 10%
   i. Voltage tolerance between 187V to 253V
c. Voltage imbalance of up to two percent;
d. Power surge of up to 5kA RMS Symmetrical.

D. General Features

1. The air-conditioning system shall use R410A refrigerant.
2. Each system shall consist of one, two or three air source outdoor unit modules conjoined together in the field to result in the capacity specified elsewhere in these documents.
3. Dual and triple frame configurations shall be field piped together using manufacturer's designed and supplied Y-branch kits and field provided interconnecting pipe to form a common refrigerant circuit.
4. System shall have following frame configurations vs. capacity.
   2 to 20 ton units shall be a single frame only.
   22 to 34 ton units shall be dual frame only.
   36 to 42 ton heat recovery units shall be triple frame only
5. System shall employ self-diagnostics function to identify any malfunctions and provide type and location of malfunctions via fault alarms.
6. All outdoor units, regardless of the Heat Pump or Heat Recovery models, shall be the same generation and provide with most up to date firmware version at the time of delivery. Manufacturers commissioning agents shall assure the owner in the commissioning report that the latest software version.
7. If the specifications include both heat pump and heat recovery outdoor models, the manufacturer shall provide the most recent generation equipment only. Old stock or obsolete models will not be accepted. Products purchased over the internet and not from the manufacturer's authorized local mechanical representative or authorized distributer will not be accepted.

8. Field Provided Refrigerant Piping:

a. The refrigerant circuit shall be constructed using field provided ACR copper, de-hydrated, refrigerant rated copper pipe, piped together with manufacturer supplied Heat recovery unit(s) and Y- branches, as may be required, connected to multiple (ducted, non-ducted or mixed combination) indoor units to effectively and efficiently control the heat pump operation or simultaneous heating and cooling operation of the heat recovery VRF system. Other pipe materials, if used, shall perform, at a minimum, as well as that specified above, shall not have any adverse reactions, for example galvanic corrosion, to any other components or materials also in use in the system and shall be installed per manufacturer's instructions.

b. The unit shall be shipped from the factory fully assembled including internal refrigerant piping, inverter driven compressor(s), controls, temperature sensor, humidity sensor, contacts, relay(s), fans, power and communications wiring as necessary to perform both Heat Pump and Heat recovery operations.

c. Each outdoor unit refrigeration circuit shall include, but not limited to, the following components:

i. Refrigerant strainer(s)
ii. Check valve(s)
iii. Inverter driven, medium pressure vapor injection, high pressure shell compressors
iv. Liquid refrigerant cooled inverter PCB
v. Oil separator(s)
vi. Accumulator /controlled volume receiver(s)
vii. 4-way reversing valve(s)
viii. Vapor injection valve(s)
ix. Variable path heat exchanger control valve(s)
x. Oil balancing control
xi. Oil Level sensor(s)
xii. Electronic expansion valve(s)
xiii. Double spiral tube sub-cooler (s) and EEV
xiv. Vapor Injection Valve(s)
xv. High and low side Schrader valve service ports with caps
xvi. High/low Service valves
xvii. Threaded fusible plug
xviii. High pressure switch

9. Field Insulation:

a. All refrigerant pipe, y-branches, elbows and valves shall be individually insulated with no air gaps. Insulation R-value (thickness) shall not be less than the minimum called for by the local building code, local energy code or as a minimum per manufacture installation requirements. In no case shall the insulation be allowed to be compressed at any point in the system.

i. All joints shall be glued and sealed per insulation manufactures instructions to make an air-tight assembly.

10. Microprocessor:

a. Factory installed microprocessor controls in the outdoor unit(s), heat recovery unit(s), and indoor unit(s) shall perform functions to optimize the operation of the VRF system and communicate in a daisy chain configuration between outdoor unit and heat recovery unit(s) and indoor unit(s) via RS485 network. Controls shall also be available to control other building systems as required from the VRF control system. DIO/AIO capabilities shall be available as well as a central controller to perform operation changes, schedules and other duties as required by this specification. Addition of separate building control system shall not be required. Other control devices and sequences shall be as specified in other sections of this project specification.

11. Inverter PCB Cooling:

a. Cooling of the inverter PCB shall be conducted by way of high pressure, sub-cooled liquid refrigerant via heat exchanger attached to the inverter PCB. The full capacity flow of refrigerant shall pass though the heat exchangers to maximize the cooling effect of the PCBs and to aid in the evaporation process and capacity of the outdoor coil during the heating mode. The recovered heat of the PCBs must be used to enhance the overall heating process, other uses or dissipation of heat to ambient shall not be permitted.

12. Compressor Control:

a. Fuzzy control logic shall establish and maintain target evaporating temperature (Te) to be constant on cooling mode and condensing temperature (Tc) constant on heating mode by Fuzzy control logic to ensure the stable system performance.

13. Initial Test Run (ITR) (Heating or Cooling) / Fault Detection Diagnosis (FDD) Code:

a. This control mode shall monitor and display positive or negative results of system initial startup and commissioning. Heating or Cooling ITR mode will be automatically selected. It shall monitor and provide performance metrics for the following, but not be limited to, refrigerant quantity charge, auto-charge, stable operations, connection ratios, indoor unit status, error status, and number of indoor units connected. This control mode shall not replace the system error monitoring control system.

14. BMS Integration:

a. The VRF system shall be able to integrate with Building Management Systems via BACnet™ IP gateway. This gateway converts between BACnet™ IP or Modbus TCP protocol, and RS-485 LGAP (LG Aircon protocol) allowing third party control and monitoring of the LG A/C system, or LonWorks™ gateways. See controls specification for points list.

15. Wi-Fi Communication:

    a. The outdoor unit shall be Wi-Fi enabled and capable. Wi-Fi shall allow service or maintenance personal access to the complete operating system, via LGMV mobile, without need of tools other than smart phone or tablet. Active live system review, collection of all system data for a field determined duration presented in a .csv file format or collection of all operating conditions, including all indoor units, valves, sensors, compressor speeds, refrigerant pressures, etc., by snapshot of conditions and placing that snapshot into a power point slide to be reviewed at another time. Systems that require computers, hard wire only connection or other devices to collect, review or record operating conditions shall not be allowed.

16. Indoor Unit Connectivity:

    a. The system shall be designed to accept connection up to 64 indoor units of various configuration and capacity, depending on the capacity of the system.

17. Power and Communication Interruption:

    a. The system shall be capable of performing continuous operation when an individual or several indoor units are being serviced; communication wire cut or power to indoor unit is disconnected. Systems that alarm and/or shut down because of a lack of power to any number of indoor units shall not be acceptable.

18. Connection Ratios:

    a. The maximum allowable system combination ratio for all VRF systems shall be 130% and the minimum combination ratio shall be 50%.

19. Comfort Cooling Mode:

    a. Comfort cooling shall be initiated via a field setting at the outdoor unit during commissioning or anytime thereafter. Comfort cooling shall allow user to select all or some of the zones on a system to adjust automatically their evaporator temperatures, independent of other zones, based on the impending total loads of that zone determined by using the zone controller temperature sensor.

20. The outdoor unit refrigerant circuit shall employ for safety a threaded fusible plug.

21. Refrigerant Flow Control

    a. An active refrigerant control and multi section accumulator-receiver that dynamically changes the volume of refrigerant circulating in the system based on operating mode and operating conditions to ensure maximum system performance and efficiency.

b. Subcooler: The VRF outdoor unit shall include a factory provided and mounted sub-cooler assembly consisting of a shell and tube-type sub-cooling heat exchanger and EEV providing refrigerant sub-cooling modulation control by fuzzy logic of EEV and by mode of operation to provide capacity and efficiency as required. Brazed plate heat exchangers shall not be allowed for this function.

c. Smart Load Control: The air source unit shall be provided with Smart Load Control (SLC) enhanced energy saving algorithm that reduces compressor lift during off peak operation. Smart load control operation shall enhance energy savings and increase indoor comfort by monitoring the real time ambient temperature, real time weighted mean average building load, and the outdoor relativity humidity (if enabled).

i. The SLC algorithm shall be monitoring in real time, the rate of change of the outdoor ambient air temperature, either the outdoor ambient air relative humidity or the indoor air relative humidity [field selectable], and the rate of change of the building load.

ii. The SLC algorithm shall foresee pending changes in the building load, outdoor temperature and humidity (or indoor humidity) and proactively reset head and/or suction pressure targets in anticipation of the reduction/increase in building load.

iii. The SLC algorithm shall provide no fewer than 3 field selection options to maximize the control of the VRF system operation during morning warm-up or cool-down following night-setback reset. The selection shall be set by the commissioning agent (or at any other time thereafter). Selectable algorithm choices include:

1. Maximize energy savings
2. Balance the rate of temperature change with energy consumed.
3. Quickly cool/heat the building.

22. Refrigerant Volume Management

a. Active Refrigerant Charge

i. The VRF system shall be able to operate at any and all published conditions year round in cooling or heating mode without the need of adding or removing refrigerant from the system.

ii. The air source unit shall be provided with an isolated vessel to store spare refrigerant and actively pass refrigerant to (or from) the accumulator in real time as necessary to maintain stable refrigeration cycle operation.

iii. The air source unit microprocessor shall be provided with an algorithm that monitors the VRF system head pressure, suction pressure, subcooling, superheat, compressor speed, high and low side temperatures and the load on the system to adjust the volume of refrigerant actively circulating.

b. Manual Seasonal Refrigerant Charge Adjustments

(Applicable for VRF systems without Active Refrigerant Charge)

i. Alternates: Systems that CANNOT passively and automatically modify the active refrigerant charge using the method(s) stated to

maintain stable cycle operation shall clearly state so in bold capital letters in the proposal. VRF systems that cannot perform active refrigerant control may submit a proposal as an Alternate and must include as part of the equipment price the cost of to provide bi-annual refrigerant charging services for 15 years. Service shall be performed by the factory authorized agent only. Service shall include refrigerant, parts, labor, and fees necessary to analyze the current state of the system and perform the refrigerant charge adjustment. Service must occur one month before the winter season and one month before the summer season.

ii. If the VRF system requires a charge adjustment more frequently to maintain stable operation, the VRF manufacturer shall provide additional services at no additional charge.

iii. The 15 year period shall begin on the date the equipment is commissioned or the date the building occupancy permit was issued for the area(s) served by the system – whichever date is later.

iv. This service shall be underwritten, warranted, and administered by the VRF equipment manufacturer – not the local distributor or applied representative.

v. The selected service provider shall be mutually agreeable between the building owner (or owners agent) and must be licensed, insured, and trained to work on the VRF system. No third party service (subcontracted service) providers will be acceptable.

vi. If the service provider is not an employee of the VRF manufacturer, the service provider shall be reimbursed for services rendered directly from the manufacturer. Labor rate for services shall be paid at the prevailing wage rate in place at the time of service.

23. VRF Systems with Onboard Alternate Operating Mode Selection Capability

a. All VRF systems which provide field selectable Alternate Operating Modes, for example, High Heat or High Ambient Cooling, published data tables must be available to the public for all modes offered.

b. Acceptable Alternate Operating Modes must ship with all models of the VRF product offering and must be factory embedded. Custom factory or field modifications to factory provided algorithms created to meet scheduled requirements are not acceptable.

c. Provide a copy of instructions required to set the Alternate Operation Mode with the initial submittal.

d. For systems that provide field selectable Alternate Operating Modes, ALL technical data provided in the submittal data sheets showing product rated condition performance data, must also provide separate data sheets that show product performance data at each of the field selectable Alternate Operating Modes available. Capacity, power input, and acoustic performance data for each mode offered shall be reported separately. Mixing of ODU, IDU, or VRF system performance capability operating in one mode with for example the power consumption, sound power rating,

or electrical requirements of the same system operating in another mode is not acceptable.

E. Field Supplied Refrigerant Piping Design Parameters

1. The outdoor unit shall be capable of operating at an elevation difference of up to 360 feet above or below the lowest or highest indoor unit respectively without the requirement of field installed subcooler or other forms of performance enhancing booster devices for the Multi V 5 Series, and 164 feet above or 131 feet below for Multi V S Series.
2. The outdoor unit shall be capable of operating with up to 3280 for the Multi V 5 Series and 984 for the Multi V S Series equivalent length feet of interconnecting liquid line refrigerant pipe in the network.
3. The outdoor unit shall be capable of operating with up to 656 actual feet for the Multi V 5 Series and 592 actual feet for the Multi V S Series or 738 equivalent length feet for the Multi V 5 Series and 574 equivalent length feet for the Multi V S Series of liquid line refrigerant pipe spanning between outdoor unit and farthest indoor unit.
4. The piping system shall be designed with pipe expansion and contraction possibilities in mind. Required expansion devices shall be field designed, supplied and installed based on proper evaluation of the proposed piping design. In addition to these requirements, the piping system installation must conform to the VRF equipment manufacturer's published guidelines.
5. The installation of pipe hangers, supports, insulation, and in general the methods chosen to attach the pipe system to the structure must allow for expansion and contraction of the piping system and shall not interfere with that movement.
6. The elevation difference between indoor units on heat pump systems shall be 131 feet for the Multi V 5 Series and 49 feet for the Multi V S Series.
7. The elevation differences for heat pump systems shall be:
   a. Heat recovery unit to connected indoor unit shall be 49 feet
   b. Heat recovery unit to heat recovery unit shall be 98 feet
   c. Indoor unit to indoor unit connected to same heat recovery unit shall be 49 feet
   d. Indoor unit to indoor unit connected to separate parallel piped heat recovery units shall be 131 feet.
8. The acceptable elevation difference between two series connected heat recovery units shall be 16 feet.

F. Defrost Operations

1. The outdoor unit(s) shall be provided with a minimum of 4 independent field adjustable defrost cycle algorithms to maximize the effectiveness of the defrost cycle to the local weather conditions. Intelligent Defrost shall melt accumulated frost, snow and ice from the outdoor unit heat exchanger. The defrost cycle length and sequence shall be based on outdoor ambient temperatures, outdoor unit heat exchanger temperature, and various differential pressure variables. Intelligent Heating Mode, when outdoor unit humidistat is engaged, shall extend the normal heating sequences by adjusting the outdoor unit coil target

temperature to be above the ambient dew point temperature delaying the need for defrost operations, so long as heating demand is being met.

2. Smart Heating: This feature shall be capable of eliminating several defrost actions per day based on outdoor air temperature and humidity conditions. Smart heating shall extend the heating operation cycle by delaying the frost formation on the outdoor coil by adjusting the surface temperature to keep it above the current outdoor ambient dew point. The algorithm shall delay while maintaining indoor space temperature.

3. Defrost Mode Selection: The outdoor unit shall be provided with a minimum of three field selectable defrost operation modes: Normal, Fast, or Forced.

   a. Normal Defrost: Operation intended for use in areas of the country that experience adverse winter weather with periods of heavy winter precipitation and extremely low temperatures. This strategy shall maximize the systems heating performance and maintain operational efficiency. When the ambient temperature is either: a) above 32°F or b) below 32°F with the humidity level below 60% RH, Intelligent Defrost shall continue heating regardless of ice build-up on the coil until the quality of the heated air (i.e., discharge air temperature) decreases. At temperatures below 4°F, a defrost cycle shall occur every two hours to optimize system heating efficiency.

   b. Fast Defrost: Operation intended for use in areas of the country with mild winter temperatures and light to moderate humidity levels. The strategy minimizes defrost cycle frequency allowing frozen precipitation to build longer in between cycles. Minimum time between defrost cycles shall be 20 minutes. Intelligent Defrost shall choose between split coil/frame and full system methods based on current weather conditions to minimize energy consumption and maximize heating cycle time.

   c. Forced Defrost: Operation shall be available for the service provider to test defrost operations at any weather condition and to manually clear frozen water from the outdoor coil surfaces.

4. Defrost Method Selection: The outdoor unit shall be provided with two field selectable defrost operation methods: Split Coil/Frame and Full System. Split Coil/Frame option provides continuous heating of the occupied space during defrost operation.

   a. Split Coil/Frame method shall be available when Normal Defrost mode is selected. Split Coil method shall be available on all Heat Pump and Heat recovery single-frame VRF systems. Split Frame defrost shall be available on all Heat Pump and Heat recovery multi-frame outdoor units.

   b. Split Coil method shall remove ice from the bottom half of the outdoor unit coil first for a maximum time of six minutes, then the top half for a maximum of six minutes. Next the bottom coil shall be heated again for an additional three minutes to remove any frozen water that may have dripped onto the lower coil during the top coil defrost operation.

   c. When Split Coil/Frame method is selected, a Full System defrost shall occur every 1-9 (field selectable) defrost cycles to assure 100% of the frozen precipitation has been removed to maintain efficient performance.

   d. Full System method shall be available as a field selectable option. All outdoor units located in areas of the country where large volumes of

frozen precipitation are common, the commissioning agent shall be able to select the Full System only defrost method.

5. Indoor Unit Fan Operation During Defrost
   a. During partial defrost operation indoor units operating in cooling or dry mode shall continue normal operation.
   b. During partial defrost operation, indoor units that are commissioned with fans set for continuous operation shall maintain normal fan speed unless the leaving air temperature drops, then the fan speed will be reduced to low speed for the remainder of the defrost cycle.
   c. During full system defrost operation indoor unit fans will cycle off and remain off during the remainder of the defrost cycle.

G. Oil Management

1. The system shall utilize a high pressure oil return system to ensure a consistent film of oil on all moving compressor parts at all points of operation. Oil is returned to compressor through a separate high pressure oil injection pipe directly into the oil sump. Oil returned to the compressor via the suction port of the compressor shall not be allowed.
2. Each compressor shall be provided with a high efficiency independent centrifugal cyclone type oil separator, designed to extract oil from the oil/refrigerant gas stream leaving the compressor.
3. The system shall have an oil level sensor in the compressor to provide direct oil level sensing data to the main controller. The sensor shall provide data to main outdoor unit PCB to start oil return mode and balance oil levels between multiple compressors.
4. The system shall only initiate an oil return cycle if the sensed oil level is below oil level target values as determined by the microprocessor. The system shall display an error if the oil sensor signals low oil level for a period of 130 minutes or longer.
5. A default oil return algorithm shall automatically initiate the oil return mode if the system detects a failure of the oil sump sensor. A fault code shall be reported by the system.
6. Timed oil return operations or systems that do not directly monitor compressor oil level shall not be permitted.

7. Indoor Unit Fan Operation during Oil Return Cycle.
   a. During oil return cycle indoor units operating in cooling or dry mode shall continue normal operation.
   b. During oil return, indoor units that are commissioned with fans set for continuous operation shall maintain normal fan speed unless the leaving air temperature drops, then the fan speed will be reduced to low speed for the remainder of the oil return cycle.
   c. During oil return cycle indoor unit fans will cycle off and remain off during oil return cycle while operating in all modes.

H. Fan and Motor Assembly

1. 6 ton frames shall be equipped with one direct drive variable speed propeller fan with Brushless Digitally Controlled (BLDC) motor with a vertical air discharge Heat Pump ARUN024GSS4 unit shall be equipped with one direct drive, variable speed, and axial flow fan with a horizontal air discharge. The motors shall be Brushless Digitally Controlled (BLDC), variable speed, inverter driven motors.
2. 8 to 20 ton frames shall be equipped with two direct drive variable speed propeller fan(s) with BLDC motor(s) with a vertical air discharge. Heat Pump ARUN038GSS4~ARUN060GSS4 and Heat Recovery unit ARUB060GSS4 shall be equipped with two direct drive variable speed axial flow fan(s) with a horizontal air discharge. Each fan shall be provided with an independent dedicated Brushless Digitally Controlled (BLDC), variable speed, inverter driven motors.
3. The fan(s) blades shall be made of Acrylonitrile Butadiene Styrene (ABS) material and incorporate biomimetic technology to enhance fan performance and reduce fan generated noise.
4. The fan(s) motor shall be equipped with permanently lubricated bearings.
5. The fan motor shall be variable speed with an operating speed range of 0-1150 RPM cooling mode and 0-1150 RPM heating mode. The fan assembly(s) shall have a minimum operating speed range from 0 RPM to 850 RPM in cooling mode and heating mode.
6. The fan shall have a guard to help prevent contact with moving parts.
7. The cabinet shall have option to redirect the discharge air direction from vertical to
8. The fan controller shall have a DIP switch setting to raise external static pressure of the fan up to 0.32 inch of W.C. to accommodate ducted installations.
9. The fan control shall have a function setting to remove excess snow automatically.
10. The fan control shall have a function setting to remove access dust and light debris from the outdoor unit and coil.

I. Cabinet

1. Outdoor unit cabinet shall be made of 20 gauge galvanized steel with a weather and corrosion resistant enamel finish. Outdoor unit cabinet finish shall be tested in accordance with ASTM B-117 salt spray surface scratch test (SST) procedure for a minimum of 1000 hours.
2. Cabinet weights and foot prints shall vary between 430 lbs., 7.61 sq. ft. (1.27 sq. ft. per ton), for 6 ton cabinet to 666 lbs., 10.14 sq. ft. (.51 sq. ft. per ton), for 20 ton cabinet for single cabinet configurations. The front panels of the outdoor units shall be removable type for access to internal components.
3. A smaller service access panel, not larger than 7” x 7” and secured by a maximum of (2) screws, shall be provided to access the following
    a. Service tool connection
    b. DIP switches
    c. Auto addressing
    d. Error codes
    e. Main microprocessor
    f. Inverter PCB

4. The cabinet shall have piping knockouts to allow refrigerant piping to be connected at the front, right side, or through the bottom of the unit.
5. The cabinet shall have a factory installed coil guard and shall have a baked enamel finish.

J. Outdoor Unit Coil

1. Outdoor unit coil shall be designed, built and provided by the VRF outdoor unit manufacturer.
2. The outdoor unit coil for each cabinet shall have lanced aluminum fins with a maximum fin spacing of no more than 17 Fins per Inch (FPI). All the outdoor unit coils shall be a 2 or 3 rows consisting of staggered tubes for efficient air flow across the heat exchanger.
3. Outdoor unit coil shall be comprised of aluminum fins mechanically bonded to copper tubing with inner surfaces having a riffling treatment to expand the total surface of the tube interior
4. The aluminum fin heat transfer surfaces shall have factory applied corrosion resistant Black Fin coating. The copper tubes shall have inner riffling to expand the total surface of the tube interior.
   a. ISO 21207 Salt Spray Test Method B – 1500 hours
   b. ASTM B-117 Acid Salt Test – 900 hours
   c. The Black Fin coating shall be certified by Underwriters Laboratories and per ISO 21207. The above conditions shall establish the minimum allowable performance which all alternates must comply.
5. Variable Path Heat Exchanger: System shall have a variable flow and path outdoor heat exchanger function to vary the refrigerant flow and volume and path. Control of the variable path circuits shall be based on system operating mode and operating conditions as targeted to manage the efficiency and minimize or maximize the circulating volume of the operating fluids of the system. This feature allows MV 5 to maintain system head pressure that delivers “gas-furnace leaving air temperature” from the indoor unit at moderate and low ambient outdoor air temperatures. The outdoor unit coil, all indoor units and pipe network shall be field tested to a minimum pressure of 550 psig.

K. Compressor(s)

1. Compressor shall be designed and assembled by the VRF manufacturer specifically for use in the air source VRF product line. Third party manufactured, branded, or designed to the VRF system’s OEM specifications by a third party manufacturer shall not be acceptable.
2. Compressor shall be a hermetic, high-side shell (HSS), commercial grade, compliant scroll direct-drive design.

   a. Compressor Design: The compressor design shall be of the high pressure shell scroll type where the internal pressure below the suction valves of the compressor shall be at the same high pressure and high temperature. The motor shall be cooled by high pressure gas at temperatures above saturation conditions and minimize the mixing of refrigerant liquid with oil in the sump. The system shall employ a high pressure oil return method

returning recovered oil from the oil separator directly into the oil sump of the compressor; oil shall not be allowed to return via the suction line. Bearing surfaces are continually coated with oil. The compressor shall employ an Aero-bearing constructed with high lubricity materials increasing operation time in case of low sump oil level. Compressor shall have a nominal operating range from 12Hz to 150 Hz.

3. The fixed and oscillating compressor scroll components shall be made of high grade (GC25) or denser steel material. All scrolls shall be heat treated and tempered.
4. The oscillating scroll shall be finely machined and polished. PVE refrigerant oil shall be used as the sole liquid used to maintain a seal between the high and low sides of the compression chamber. Compressors that require the use of any type of mechanical or wearable sealant material between the moving surfaces of the compression chamber is NOT ACCEPTABLE.
5. Vapor Injection: System shall have a medium pressure gas vapor injection function employed in the heating and cooling modes to increase system capacity when the outdoor ambient temperatures are low and lower compressor lift when temperatures are high. The compressor vapor injection flow amount shall be controlled by the vapor injection sub-cooling algorithm reset by discharge gas temperatures of the compressor.
6. Bearing surfaces shall be coated with Teflon® equal. Bearings shall be lubricated using a constant flow of PVE refrigerant oil to the bearing surfaces the film of oil separating the crankshaft journals and bearing surfaces shall be consistent at all times the crankshaft is in motion and shall be maintained irrelevant of crankshaft rotational speed.
7. An internal, integrated, mechanically driven gear pump shall draw oil from the compressor sump reservoir, pressurize the oil and inject the oil directly to the crankshaft journals maintaining a consistent film of oil between all moving parts. Auxiliary, indirect, or electronically driven pumps are not acceptable.
8. The viscosity property of the PVE oil in the compressor sump shall be maintained irrelevant or compressor operation and the surrounding ambient temperature.

    a. The compressor shall be equipped with an external thermally protected electric crankcase heater that is automatically activated only when the ambient temperature is below freezing, and the compressor is not running to maintain the temperature of the oil in the sump above the refrigerant boiling point.
    b. During stable operation, irrelevant of ambient air temperature outside the water source unit, the temperature of refrigerant vapor in contact with the surface of the oil in the compressor sump shall be maintained above 140°F to prevent foaming and to eliminate refrigerant from mixing with the oil degrading the viscosity of the oil in the sump.
    c. Low side shell (LSS) type compressors that use suction vapor to cool the compressor motor shall not be acceptable.
9. The compressor motor shall be designed to operate at high temperatures.

    a. The motor winding insulation shall be designed to operate continuously at a minimum temperature of 180°F without deterioration.

b. The motor cooling system shall be designed to maintain acceptable operational temperature at all times and in all conditions using high pressure, hot refrigerant vapor as motor coolant.
c. Low side shell and compressors that use low pressure, low temperature refrigerant gas to cool the motor are not acceptable.

10. Inverter Compressor Controller(s)

a. Each compressor shall be equipped with a dedicated inverter compressor drive. The control of multiple compressors using a single drive is not acceptable.
b. The inverter drive shall vary the speed of the compressor crankshaft between zero (0) Hz and 140 Hz.
c. The inverter driver controller shall be matched with the physical properties of the compressor. The drive shall be manufactured by the VRF air source unit manufacturer. The inverter drive and matching compressor shall have been thoroughly tested as a matched pair. The inverter drive shall be programmed to avoid operating the compressor at any speed that results in harmonic vibration, nuisance noise, or mechanical damage to either the driver or the compressor with power provided that is within the tolerance specification.
d. The compressor inverter drive assembly and software must be designed, manufactured, and supplied by the VRF product manufacturer. Third party branded inverter driver hardware and/or driver software or inverter driver hardware and/or software provided by a third party manufacturer to meet OEM specifications of the VRF water source manufacturer will not acceptable.
e. All inverter drive hardware or software manufactured in, is a product of, or sourced from China, or using a broker or third party provider as an intermediary that obtains the product from CHINA shall not be acceptable.

11. Compressor(s)

a. Each 6, 8, 10 ton frames shall be equipped with a single hermetically sealed, inverter driven, High Side Shell (HSS) scroll compressor.
b. 12, 14, 16, 18 and 20 ton frames shall be equipped with dual hermetically sealed, inverter driven, High Side Shell (HSS) scroll compressors.
c. Each inverter driven, HSS scroll compressor shall be capable of operating from 12 Hz up to 150 Hz in any and all modes (cooling, heating or simultaneous modes).
d. The compressor shall be designed for a separate port for oil to be directly returned to the compressor oil sump.
e. The compressor bearing(s) shall have Teflon™ coating and shall be an aero type design using High lubricity materials.
f. The compressor(s) shall be protected with:
    i. High Pressure switch
    ii. Over-current /under current protection
    iii. Oil sump sensor
    iv. Phase failure
    v. Phase reversal
    vi. Compressor shall be capable of receiving injection of medium pressure gas at a point in the compression cycle where such injection shall allow a greater mass flow of refrigerant at lower

outdoor ambient and achieving a higher heating capability. The VRF outdoor unit shall have published performance data for heating mode operation down to -13°F on both heat pump and heat recovery systems.

g. Standard, non-inverter driven compressors shall not be permitted nor shall a compressor without vapor injection or direct sump oil return capabilities.

12. Heat Pump models:

a. The compressor shall be a high efficiency high-side shell rotary hermetic design. Bearing shall be manufactured using high lubricity material. Compressor shall be factory charged with Polyvinyl Ether (PVE) oil. Single or dual speed compressors charged with oil (POE) shall not be acceptable. Compressor inverter drive shall Polyolester allow modulation from 20Hz to 90Hz with control in 1.0 Hz increments depending on the nominal capacity. (ARUN060GSS4) The compressor shall be a high-side shell hermetic scroll design. Oil sump area and chamber housing the motor shall be operated at the same temperature and pressure of the gas leaving the compressor chamber to ensure that the low temperature low pressure refrigerant returning to the compressor does not mix with the oil in the sump. Bearing shall be manufactured using high lubricity material. Compressor shall be factory charged with Polyvinyl Ether (PVE) oil. Single or dual speed compressors charged with Polyolester oil (POE) oil shall not be acceptable. Compressor motor shall be designed to operate at a frequency range of 0Hz to 160Hz. Compressor inverter drive shall allow modulation from 12Hz to 110Hz.

13. Heat Recovery models:

a. The compressor design shall be of the high pressure shell scroll type where the internal pressure below the suction valves of the compressor shall be at the same high pressure and high temperature. The motor shall be cooled by high pressure gas at temperatures above saturation conditions and minimize the mixing of refrigerant liquid with oil in the sump. The system shall employ a high pressure oil return method returning recovered oil from the oil separator directly into the oil sump of the compressor; oil shall not be allowed to return via the suction line. Bearing surfaces are continually coated with oil. The compressor shall employ an Aero-bearing constructed with high lubricity materials increasing operation time in case of low sump oil level. Compressor shall have a nominal operating range from 12Hz to 110 Hz.

L. Operational Sound Levels

1. Each single frame outdoor unit shall be rated with an operational sound pressure level not to exceed as listed on below chart when tested in an anechoic chamber under ISO 3745 standard at the highest field selectable heating operating modes available. Such documentation shall be presented in all submittals, manufactures who elect to rate their equipment at other than tested in an anechoic chamber under ISO 3745 standard at the highest field selectable heating operating modes available and the highest field selectable conditions shall not be allowed.

2. A field setting shall be available to program the outdoor unit to reduce sound levels at night, when desired, to a selectable level while still able to meet building load requirement. This mode is available in both cooling and heating modes.

M. Sensors

1. Each outdoor unit module shall have:

a. Suction temperature sensor
b. Discharge temperature sensor
c. Oil level sensor
d. High Pressure sensor
e. Low Pressure sensor
f. Outdoor temperature sensor
g. Outdoor humidity sensor
h. Outdoor unit heat exchanger temperature sensors

N. Wind Load Installations for Outdoor Units

1. LG FL Wind load Installation Drawings meet the requirements of the 2017 Florida Building Code, 6th Edition and ASCE Standard 7-2010.

O. Seismic Installations

1. Provide OSHPD Special Seismic Certification Preapproval (OSP) documents for certified product list of VRF equipment to be installed in high seismic risk areas. Provide LG supplemental installation documents in conformance with CBC 2013, 2016 and 2019 California Building Code and IBC 2012, 2015 and 2018 International Building Code.

P. Warranty

1. Limited Warranty Period

a. STANDARD ONE-YEAR PARTS WARRANTY FOR A QUALIFIED SYSTEM - The Part(s) of a qualified System, including the compressor, are warranted for a period (the “Standard Parts Warranty Period”) ending on the earlier to occur of one (1) year after the date of original installation, or eighteen (18) months from the date of manufacture.

b. ADDITIONAL SIX (6) YEAR COMPRESSOR PART WARRANTY - The Compressor is warranted for an additional six (6) year period after the end of the applicable Standard Part Warranty Period (the “Compressor Warranty Period”).

2. Extended Warranty

a. The Standard Warranty Period and the Compressor Warranty Period are extended to a total of ten (10) years (the “Extended Warranty Period”) for qualified Systems that have been (a) commissioned by a party that has completed the current Training Requirements, (b) such commissioning is pursuant to LG’s current published instructions, and (c) the System commissioning results and supporting documents are entered correctly

into LG's online commissioning system. Commissioning of a System requires one (1) hour of LG Monitoring View (LGMV) data. Commissioning results must be entered into LG's online commissioning system within sixty (60) days of System startup.

2.2 EEV KIT

A. General

1. Unit shall be manufactured by LG.
2. Unit shall be factory assembled and wired unit shall be designed to be installed indoors only, when installed outdoors provide NEMA weatherproof enclosure.
3. Unit shall be capable to be installed with heat pump or heat recovery VRF system.
4. Unit requires one communication kit to provide power and control signals.
5. Connects liquid line piping from outdoor unit to any AHU coil.

B. Electrical

1. Six conductor, 18 GA shielded and stranded field supplied wiring for 12 volt (low voltage) power and control signal from communication kit.

2.3 AHU COMMUNICATION KIT PAHCMR00 (RETURN AIR CONTROL)

A. General

1. Unit shall be manufactured by LG.
2. Unit shall be factory assembled and wired.
3. Unit shall be designed to be installed for indoor or outdoor.
4. Unit shall be capable to be installed with heat pump or heat recovery VRF system.
5. Allows communication between third party air handling unit (AHU) and LG Multi V air-source or water-source outdoor units with combination ratio between 50% to 100%.
6. Requires one EEV kit to control the flow of refrigerant from Multi V outdoor unit to AHU coil.

B. Electrical:

1. The unit electrical power shall be 208-230/1/60 (V/Ph/Hz).

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230265

SECTION 230280 - VARIABLE FREQUENCY DRIVES

PART 1 – GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION

A. This specification is to cover a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use with a standard NEMA Design B induction motor.

B. The drive manufacturer shall supply the drive and all necessary options as herein specified. The manufacturer shall have been engaged in the production of this type of equipment for a minimum of twenty years. VFD's that are manufactured by a third party and "brand labeled" shall not be acceptable. All VFDs installed on this project shall be from the same manufacturer.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Institute of Electrical and Electronic Engineers (IEEE)
   a. Standard 519-1992, IEEE Guide for Harmonic Content and Control.

2. Underwriters laboratories
   a. UL508C

3. National Electrical Manufacturer's Association (NEMA)
   a. ICS 7.0, AC Adjustable Speed Drives

4. IEC 16800 Parts 1 and 2

5. National Electric Code (NEC)
   a. NEC 430.120, Adjustable-Speed Drive Systems

6. International Building Code (IBC)
   a. IBC 2006 Seismic – referencing ASC 7-05 and ICC AC-156

B. Qualifications:

1. VFDs and options shall be UL listed as a complete assembly. VFD's that require the customer to supply external fuses for the VFD to be UL listed are not acceptable. VFDs with red label UL stickers, requiring additional branch circuit protection are not acceptable. The base VFD shall be UL listed for 100 KAIC without the need for input fuses.
2. CE Mark – The VFD shall conform to the European Union ElectroMagnetic Compatibility directive, a requirement for CE marking. The VFD shall meet product standard EN 61800-3 for the First Environment restricted level.

3. The entire VFD enclosure, including the bypass shall be seismically certified and labeled as such in accordance with the 2006 International Building Code (IBC):
   a. VFD manufacturer shall provide Seismic Certification and Installation requirements at time of submittal.

   b. Seismic importance factor of 1.5 rating is required, and shall be based upon actual shake test data as defined by ICC AC-156.

   c. Seismic ratings based upon calculations alone are not acceptable. Certification of Seismic rating must be based on testing done in all three axis of motion.

4. Acceptable Manufactures

   a. ABB ACH Series.

   b. Alternate manufacturer's requests must be submitted in writing to the Engineer for approval at least 20 working days prior to bid. Approval does not relieve the supplier of specification requirements.

5. The VFD manufacturer shall have available a comprehensive, HVAC Drive Computer Based Training (CBT) product. The CBT product shall include detailed, interactive sections covering VFD unpacking, proper mechanical and electrical installation, and programming. The CBT product shall allow the user to provide just-in-time training to new personnel or refresher training for maintenance and repair personnel on the user's site. The CBT product shall be repeatable, precise and shall include record keeping capability. The CBT product shall record answers to simulations and tests by student ID number. The CBT product must be professionally produced and have interactive sections, student tests, and include video clips of proper wiring and installation.

1.3 SUBMITTALS

A. Submittals shall include the following information:

1. Outline dimensions, conduit entry locations and weight.

2. Customer connection and power wiring diagrams.

3. Complete technical product description includes a complete list of options provided. Any portions of this specification not meet must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification.

4. Compliance to IEEE 519 – harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).
   a. The VFD manufacturer shall provide calculations; specific to this installation, showing total harmonic voltage distortion is less than 5%. Input filters shall be sized and provided as required by the VFD

manufacturer to ensure compliance with IEEE standard 519. All VFD's shall include a minimum of 5% impedance reactors, no exceptions.

PART 2 – PRODUCTS

2.1 VARIABLE FREQUENCY DRIVES

A. The VFD package as specified herein shall be enclosed in a UL Listed Type enclosure, exceeding NEMA enclosure design criteria (enclosures with only NEMA ratings are not acceptable), completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum.

1. Environmental operating conditions: VFDs shall be capable of continuous operation at 0 to 50^0 C (32 to 122^0 F) ambient temperature as per VFD manufacturers documented/submittal data or VFD must be oversized to meet these temperature requirements. Not acceptable are VFD's that can only operate at 40° C intermittently (average during a 24 hour period) and therefore must be oversized. Altitude 0 to 3300 feet above sea level, less than 95% humidity, non-condensing. All circuit boards shall have conformal coating.

2. Enclosure shall be rated UL Type 1 and shall be UL listed as a plenum rated VFD. VFD's without these ratings are not acceptable. NEMA only type 1 enclosures are not acceptable (must be UL Type 1).

3. Provide NEMA 3R enclosures where exposed to outside weather or wet conditions.

B. All VFDs shall have the following standard features:

1. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.

2. The keypad shall include Hand-Off-Auto selections and manual speed control. The drive shall incorporate "bumpless transfer" of speed reference when switching between "Hand" and "Auto" modes. There shall be fault reset and "Help" buttons on the keypad. The Help button shall include "on-line" assistance for programming and troubleshooting.

3. There shall be a built-in time clock in the VFD keypad. The clock shall have a battery back up with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. Capacitor back-up is not acceptable. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter sets and output Form-C relays. The VFD shall have a digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings.

4. The VFD's shall utilize pre-programmed application macro's specifically designed to facilitate start-up. The Application Macros shall provide one command to reprogram all parameters and customer interfaces for a particular application to reduce programming time. The VFD shall have two user macros to allow the end-user to create and save custom settings.

5. The VFD shall have cooling fans that are designed for easy replacement. The fans shall be designed for replacement without requiring removing the VFD from the wall or removal of circuit boards. The VFD cooling fans shall operate only when required. To extend the fan and bearing operating life, the VFD shall cycle the cooling fans on and off as required.

6. The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to set point without tripping or component damage (flying start).

7. The VFD shall have the ability to automatically restart after an over-current, over-voltage, under-voltage, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable.

8. The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430.250 for 4-pole motors.

9. The VFD shall have internal 5% impedance reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFD's with only one DC reactor shall add an AC line reactor.

10. The input current rating of the VFD shall be no more than 3% greater than the output current rating. VFD's with higher input current ratings require the upstream wiring, protection devices, and source transformers to be oversized per NEC 430.120. Input and output current ratings must be shown on the VFD nameplate.

11. The VFD shall include a coordinated AC transient surge protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% impedance reactors.

12. The VFD shall provide a programmable loss-of-load (broken belt / broken coupling) Form-C relay output. The drive shall be programmable to signal the loss-of-load condition via a keypad warning, Form-C relay output, and / or over the serial communications bus. The loss-of-load condition sensing algorithm shall include a programmable time delay that will allow for motor acceleration from zero speed without signaling a false loss-of-load condition.

13. The VFD shall have user programmable underload and overload curve functions to allow user defined indications of broken belt or mechanical failure / jam condition causing motor overload.

14. The VFD shall include multiple “two zone” PID algorithms that allow the VFD to maintain PID control from two separate feedback signals (4-20mA, 0-10V, and / or serial communications). The two zone control PID algorithm will control motor speed based on a minimum, maximum, or average of the two feedback signals. All of the VFD PID controllers shall include the ability for “two zone” control.

15. If the input reference (4-20mA or 2-10V) is lost, the VFD shall give the user the option of either (1) stopping and displaying a fault, (2) running at a programmable preset speed, (3) hold the VFD speed based on the last good reference received, or (4) cause a warning to be issued, as selected by the user. The drive shall be programmable to signal this condition via a keypad warning, Form-C relay output and / or over the serial communication bus.

16. The VFD shall have programmable “Sleep” and “Wake up” functions to allow the drive to be started and stopped from the level of a process feedback signal.

17. Provide drive with circuit breaker option and remote panel mounting kit.

C. All VFDs to have the following adjustments:

1. Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed. The lockout range must be fully adjustable, from 0 to full speed.

2. Two (2) PID Set point controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed-loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. The PID set point shall be adjustable from the VFD keypad, analog inputs, or over the communications bus. There shall be two independent parameter sets for the PID controller and the capability to switch between the parameter sets via a digital input, serial communications or from the keypad. The independent parameter sets are typically used for night setback, switching between summer and winter set points, etc.

3. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain the set point of an independent process (ie. valves, dampers, etc.). All set points, process variables, etc. to be accessible from the serial communication network.

4. Two (2) programmable analog inputs shall accept current or voltage signals.

5. Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, Active Feedback, and other data..

6. Six (6) programmable digital inputs for maximum flexibility in interfacing with external devices. All digital inputs shall be programmable to initiate upon an application or removal of 24VDC or 24VAC.

7. Three (3) programmable, digital Form-C relay outputs. The relay outputs shall include programmable on and off delay times and adjustable hysteresis. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous current rating of 2 amps RMS. Outputs shall be true Form-C type contacts; open collector outputs are not acceptable.

8. Run permissive circuit - There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, input contact closure, time-clock control, or serial communications), the VFD shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD digital input and allows VFD motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop and the damper shall be commanded to close. The keypad shall display "start enable 1 (or 2) missing". The safety input status shall also be transmitted over the serial communications bus.

9. The VFD control shall include a programmable time delay for VFD start and a keypad indication that this time delay is active. A Form C relay output provides a contact closure to signal the VAV boxes open. This will allow VAV boxes to be driven open before the motor operates. The time delay shall be field programmable from 0 – 120 seconds. Start delay shall be active regardless of the start command source (keypad command, input contact closure, time-clock control, or serial communications), and when switching from drive to bypass.

10. Seven (7) programmable preset speeds.

11. Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.

12. The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and reduce audible motor noise. The VFD shall have selectable software for optimization of motor noise, energy consumption, and motor speed control.

13. The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows higher carrier frequency settings without derating the VFD.

14. The VFD shall include password protection against parameter changes.

D. The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (alpha-numeric codes are not acceptable). All VFD faults shall be displayed in English words. The keypad shall include a minimum of 14 assistants including:

1. Start-up assistant

2. Parameter assistants
   a. PID assistant
   b. Reference assistant
   c. I/O assistant
   d. Serial communications assistant
   e. Option module assistant
   f. Panel display assistant
   g. Low noise set-up assistant
3. Maintenance assistant
4. Troubleshooting assistant
5. Drive optimizer assistants

E. All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):

1. Output Frequency
2. Motor Speed (RPM, %, or Engineering units)
3. Motor Current
4. Motor Torque
5. Motor Power (kW)
6. DC Bus Voltage
7. Output Voltage

F. The VFD shall include a fireman's override input. Upon receipt of a contact closure from the fire / smoke control station, the VFD shall operate in one of two modes: 1) Operate at a programmed predetermined fixed speed ranging from -500Hz (reverse) to 500Hz (forward). 2) Operate in a specific fireman's override PID algorithm that automatically adjusts motor speed based on override set point and feedback. The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands), except customer defined safety run interlocks, and force the motor to run in one of the two modes above. "Override Mode" shall be displayed on the keypad. Upon removal of the override signal, the VFD shall resume normal operation, without the need to cycle the normal digital input run command.

G. Serial Communications

1. The VFD shall have an EIA-485 port as standard. The standard protocols shall be Modbus, Johnson Controls N2, Siemens Building Technologies FLN, and BACnet. [Optional protocols for LonWorks, Profibus, EtherNet, BACnet IP, and DeviceNet shall be available.] Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" by the governing authority (i.e. BTL Listing for BACnet). Use of non-certified protocols is not allowed.

2. The BACnet connection shall be an EIA-485, MS/TP interface operating at 9.6, 19.2, 38.4, or 76.8 Kbps. The connection shall be tested by the BACnet Testing

Labs (BTL) and be BTL Listed. The BACnet interface shall conform to the BACnet standard device type of an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:

a. Data Sharing – Read Property – B.
b. Data Sharing – Write Property – B.
c. Device Management – Dynamic Device Binding (Who-Is; I-Am).
d. Device Management – Dynamic Object Binding (Who-Has; I-Have).
e. Device Management – Communication Control – B.

3. If additional hardware is required to obtain the BACnet interface, the VFD manufacturer shall supply one BACnet gateway per drive. Multiple VFDs sharing one gateway shall not be acceptable.

4. Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the DDC to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The DDC shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible.

5. Serial communication in bypass shall include, but not be limited to; bypass run-stop control, the ability to force the unit to bypass, and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the DDC to monitor feedback such as, current (in amps), kilowatt hours (resettable), operating hours (resettable), and bypass logic board temperature. The DDC shall also be capable of monitoring the bypass relay output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible.

6. The VFD / bypass shall allow the DDC to control the drive and bypass digital and analog outputs via the serial interface. This control shall be independent of any VFD function. The analog outputs may be used for modulating chilled water valves or cooling tower bypass valves. The drive and bypass' digital (Form-C relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. In addition, all of the drive and bypass' digital inputs shall be capable of being monitored by the DDC system. This allows for remote monitoring of which (of up to 4) safeties are open.

7. The VFD shall include an independent PID loop for customer use. The independent PID loop may be used for cooling tower bypass value control, chilled water value / hot water valve control, etc. Both the VFD PID control loop and the independent PID control loop shall continue functioning even if the serial communications connection is lost. As default, the VFD shall keep the last good

set point command and last good DO & AO commands in memory in the event the serial communications connection is lost and continue controlling the process.

H. EMI / RFI filters. All VFD's shall include EMI/RFI filters. The onboard filters shall allow the VFD assembly to be CE Marked and the VFD shall meet product standard EN 61800-3 for the First Environment restricted level with up to 100 feet of motor cable. No Exceptions. Certified test reports shall be provided with the submittals confirming compliance to EN 61800-3, First Environment.

I. All VFD's through 75HP at 480 V shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad. The VFD shall not sustain damage from this power mis-wiring condition.

J. OPTIONAL FEATURES – Optional features shall be furnished and mounted by the drive manufacturer. All optional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label.

1. Door interlocked, pad-lockable disconnect switch that will disconnect all input power from the drive and all internally mounted options. Disconnect option shall be available with or without systems requiring bypass.

2. Field-bus adapters - Protocols such as BACnet IP shall be a plug in modules.

K. Bypass

1. A complete factory wired and tested bypass system consisting of a door interlocked, pad-lockable circuit breaker, output contactor, bypass contactor, and fast acting VFD input fuses. UL Listed motor overload protection shall be provided in both drive and bypass modes.
2. The bypass enclosure door and VFD enclosure must be mechanically interlocked such that the disconnecting device must be in the "Off" position before either enclosure may be accessed.

3. The VFD and bypass package shall have a UL listed short circuit current rating (SCCR) of 100,000 Amps and this rating shall be indicated on the UL data label.

4. The drive and bypass package shall be seismic certified and labeled to the IBC:

   a. Seismic importance factor of 1.5 rating is required and shall be based upon actual shake table test data as defined by ICC AC-156.

5. Drive Isolation Fuses - To ensure maximum possible bypass operation, fast acting fuses, exclusive to the VFD, shall be provided to allow the VFD to disconnect from the line prior to clearing upstream branch circuit protection. This maintains bypass operation capability in the event of a VFD failure. Bypass designs which have no such fuses, or that incorporate fuses common to both the VFD and the bypass, will not be accepted. Third contactor "isolation contactors" are not an acceptable alternative to fuses, as contactors could weld closed and are not an NEC recognized disconnecting device.

6. The bypass shall maintain positive contactor control through the voltage tolerance window of nominal voltage +30%, -35%. This feature is designed to avoid contactor coil failure during brown out / low line conditions and allow for input single phase operation when in the VFD mode. Designs that will not allow input single phase operation in the VFD mode are not acceptable.

7. Motor protection from single phase power conditions - the bypass system must be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in bypass mode are not acceptable.

8. The bypass system shall be designed for stand-alone operation and shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the system for repair / replacement. Serial communications shall remain functional even with the VFD removed. Bypass systems that do not maintain full functionality with the drive removed are not acceptable.

9. Serial communications – the bypass shall be capable of being monitored and / or controlled via serial communications. On-board communications protocols shall include ModBus RTU; Johnson Controls N2; Siemens Building Technologies FLN (P1); and BACnet MS/TP.

    a. Serial communication capabilities shall include, but not be limited to: bypass run-stop control, the ability to force the unit to bypass, and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the BAS to monitor feedback such as, current (in amps), kilowatt hours (resettable), operating hours (resettable), and bypass logic board temperature. The BAS shall also be capable of monitoring the bypass relay output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible. The following additional status indications and settings shall be transmitted over the serial communications bus and / or via a Form-C relay output – keypad “Hand” or “Auto” selected, bypass selected, and broken belt indication. The BAS system shall also be able to monitor if the motor is running in the VFD mode or bypass mode over serial communications. A minimum of 50 field serial communications points shall be capable of being monitored in the bypass mode.
    b. The bypass serial communications shall allow control of the drive/bypass (system) digital outputs via the serial interface. This control shall be independent of any bypass function or operating state. The system digital (relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. All system analog and digital I/O shall be capable of being monitored by the BAS system.

10. There shall be an adjustable motor current sensing circuit for the bypass and VFD modes to provide proof of flow (broken belt) indication. The condition shall be indicated on the keypad display, transmitted over the BAS and / or via a Form-C relay output contact closure. The broken belt indication shall be programmable to be a system (drive and bypass) indication. The broken belt

condition sensing algorithm shall be programmable to cause a warning or system shutdown.

11. The digital inputs for the system shall accept 24VAC or 24VDC. The bypass shall incorporate an internally sourced power supply and not require an external control power source. The bypass power board shall supply 250 mA of 24 VDC for use by others to power external devices.

12. There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad command, time-clock control, digital input, or serial communications) the bypass shall provide a dry contact closure that will signal the damper to open before the motor can run. When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a bypass system input and allows motor operation. Up to four separate safety interlock inputs shall be provided. When any safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close. This feature will also operate in Fireman's override / smoke control mode.

13. The bypass control shall monitor the status of the VFD and bypass contactors and indicate when there is a welded contactor contact or open contactor coil. This failed contactor condition shall be indicated on the bypass LCD display, programmed to activate a Form-C relay output, and / or over the serial communications protocol.

14. The bypass control shall include a programmable time delay bypass start including keypad indication of the time delay. A Form C relay output commands the VAV boxes open. This will allow VAV boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.

15. There shall be a keypad adjustment to select manual or automatic transfer to bypass. The user shall be able to select via keypad programming which drive faults will result in an automatic transfer to bypass mode and which faults require a manual transfer to bypass. The user may select whether the system shall automatically transfer from drive to bypass mode on the following drive fault conditions:

    a. Over current
    b. Over voltage
    c. Under voltage
    d. Loss of analog input

16. The following operators shall be provided:

    a. Bypass Hand-Off-Auto
    b. Drive mode selector
    c. Bypass mode selector
    d. Bypass fault reset

17. The bypass shall include a two line, 20 character LCD displays. The display shall allow the user to access and view:

    a. Energy savings – in US dollars
    b. Bypass motor amps
    c. Bypass input voltage– average and individual phase voltage
    d. Bypass power (kW)
    e. Bypass faults and fault logs
    f. Bypass warnings
    g. Bypass operating time (resettable)
    h. Bypass energy (kilowatt hours – resettable)
    i. I/O status
    j. Parameter settings / programming
    k. Printed circuit board temperature

18. The following indicating lights (LED type), or keypad display indications shall be provided. A test mode or push to test feature shall be provided.

    a. Power-on (Ready)
    b. Run enable
    c. Drive mode selected
    d. Bypass mode selected
    e. Drive running
    f. Bypass running
    g. Drive fault
    h. Bypass fault
    i. Bypass H-O-A mode
    j. Automatic transfer to bypass selected
    k. Safety open
    l. Damper opening
    m. Damper end-switch made

19. The Bypass controller shall have six programmable digital inputs, and five programmable Form-C relay outputs. This I/O allows for a total System (VFD and Bypass) I/O count of 24 points as standard. The bypass I/O shall be available to the BAS system even with the VFD removed.

20. The on-board Form-C relay outputs in the bypass shall be programmable for any of the following indications.
    a. System started
    b. System running
    c. Bypass override enabled
    d. Drive fault
    e. Bypass fault
    f. Bypass H-O-A position
    g. Motor proof-of-flow (broken belt)
    h. Overload
    i. Bypass selected
    j. Bypass run
    k. System started (damper opening)
    l. Bypass alarm
    m. Over temperature

21. The bypass shall provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external safety interlocks shall remain fully functional whether the system is in VFD or Bypass mode. The remote start/stop contact shall operate in VFD and bypass modes. The terminal strip shall allow for independent connection of up to four (4) unique safety inputs.

22. The bypass shall include a supervisory control mode. In this bypass mode, the bypass shall monitor the value of the VFD's analog input (feedback). This feedback value is used to control the bypass contactor on and off state. The supervisory mode shall allow the user to maintain hysteresis control over applications such as cooling towers and booster pumps even with the VFD out of service.

23. The user shall be able to select the text to be displayed on the keypad when an external safety opens. Example text display indications include "FireStat", "FreezStat", "Over pressure" and "Low suction". The user shall also be able to determine which of the four (4) safety contacts is open over the serial communications connection.

24. Smoke Control Override Mode (Override 1) – The bypass shall include a dedicated digital input that will transfer the motor from VFD mode to Bypass mode upon receipt of a dry contact closure from the Fire / Smoke Control System. The Smoke Control Override Mode action is not programmable and will always function as described in the bypass User's Manual documentation. In this mode, the system will ignore low priority safeties and acknowledge high priority safeties. All keypad control, serial communications control, and normal customer start / stop control inputs will be disregarded. This Smoke Control Mode shall be designed to meet the intent of UL864/UUKL.

25. Fireman's Override Mode (Override 2) – the bypass shall include a second, programmable override input which will allow the user to configure the unit to acknowledge some digital inputs, all digital inputs, ignore digital inputs or any combination of the above. This programmability allows the user to program the bypass unit to react in whatever manner the local Authority Having Jurisdiction (AHJ) requires. The Override 2 action may be programmed for "Run-to-Destruction". The user may also force the unit into Override 2 via the serial communications link.

26. Class 10, 20, or 30 (programmable) electronic motor overload protections shall be included.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation shall be the responsibility of the mechanical contractor. The contractor shall install the drive in accordance with the recommendations of the VFD manufacturer as outlined in the VFD installation manual.

B. Power wiring shall be completed by the electrical contractor, to NEC code 430.122 wiring requirements based on the VFD input current. Caution: VFDs supplied without internal reactors have substantially higher input current ratings, which may require larger input power wiring and branch circuit protection. The contractor shall complete all wiring in accordance with the recommendations of the VFD manufacturer as outlined in the installation manual.

3.2 START-UP

A. Certified factory start-up shall be provided for each drive by a factory authorized service center. A certified start-up form shall be filled out for each drive with a copy provided to the owner, and a copy kept on file at the manufacturer.

3.3 PRODUCT SUPPORT

A. Factory trained application engineering and service personnel that are thoroughly familiar with the VFD products offered shall be locally available at both the specifying and installation locations. A toll free 24/365 technical support line shall be available.

B. A computer based training CD or 8-hour professionally generated video (VCR format) shall be provided to the owner at the time of project closeout. The training shall include installation, programming and operation of the VFD, bypass and serial communication.

3.4 WARRANTY

A. The VFD Product Warranty shall be 24 months from the date of certified start-up, not to exceed 30 months from the date of shipment. The warranty shall include all parts, labor, travel time and expenses. A toll free 24/365 technical support line shall be available.

END OF SECTION 230280

SECTION 230290 - DUCT MOUNTED COILS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 DUCT MOUNTED COILS

A. Coils as manufactured by Nationwide Coils or other approved manufacturer shall be with aluminum plate fins, have collars drawn, belled, and firmly bonded to copper tubes by mechanical expansion of tubes. No soldering or tinning used in the bonding process.

B. Coils have galvanized steel casing and are mounted pitched in the unit casing. Coils are to be removable in duct flanges. Hot water coils are continuous tube type and proof tested at 300 p.s.i.g. air pressure under water.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230290

SECTION 230300 - FANS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 FANS

A. Furnish and install fans of the type, models, size and capacity indicated on the Drawings. Models indicated are as manufactured by Carnes Company. ACME or Greenheck, with equivalent characteristics will be considered.

B. Refer to Drawing schedule for required accessories and related appurtenances.

2.2 IN LINE FANS

A. Construction: Unit exterior shall be constructed of heavy gauge galvanized steel. The fan housing shall be square in shape and readily attachable to building ductwork. Unit side panels shall be removable for easy access for maintenance and service. The power assembly shall be removable as a complete module.

B. Wheel: Wheels shall be of the centrifugal backward inclined type. Wheels shall be constructed of aluminum and contain a matching inlet venturi for optimum performance. Wheels shall be statically and dynamically balanced.

C. Shaft: Fan shafts shall be precision ground and polished. Shafts shall have a first critical speed of at least 125% of the fan’s maximum operating speed.

D. Bearings: Bearings shall be of the one piece, cast iron, pillow block type with relubricable zerk fittings. Bearings shall be designed for final system balancing.

E. Drive: Drives shall be sized for a minimum of 150% of driven horsepower. Machined, cast iron motor sheaves shall be adjustable for final system balancing.

F. Motor: Motor shall be heavy duty ball bearing type, closely matched to the fan load. All motors shall be listed by UL and/or CSA. A disconnect switch shall be factory installed and wired to the fan motors as standard. Motors shall be mounted on the outside of the unit isolated from the airstream. The belt and pillow block ball bearings shall be protected from the airstream by an enclosure.

G. Backdraft Damper: When no motorized damper is indicated on Drawings at discharge of fan, provide gravity backdraft damper.

H. Fans shall bear the AMCA ratings seal for Sound and Air performance. Fans shall carry the UL and/or CSA listing mark. Fans shall bear a permanently attached nameplate displaying model and serial number of the unit for future identification.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230300

SECTION 230315 – ELECTRIC UNIT HEATERS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 ELECTRIC UNIT HEATERS

A. Provide electric propeller fan unit heaters as manufactured by Modine or approved equal. The unit shall be completely packaged and arranged for ceiling suspension, with threaded suspension mounting sockets, (wall or ceiling mounting brackets), adjustable horizontal louvers.

B. Unit shall have a steel casing that is treated for corrosion resistance and painted with an electrostatically applied, baked on, polyester powdercoat paint finish.

C. Electric heating elements shall consist of a nickel-chromium resistance wire surrounded with magnesium oxide and sheathed in steel spiral-finned tubes. Elements shall have kilowatt rating as listed in the equipment schedule.

D. Each unit shall have a single 208-230V/60Hz/3ph motor. The motor shall be totally enclosed, continuous-duty, with automatic resetting, thermal-overload protection. Propeller fan shall be directly connected to the motor shaft and be statically balanced. The motor shall be mounted to the unit with rubber vibration absorbing material.

E. All units shall have built-in contactors and control circuit transformers (where required) to provide single-source power connection.

F. Each unit is to be design-certified by Underwriters Laboratories and be UL listed. The manufacturer of this equipment must have a minimum of eight (8) years operating experience.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 320315

SECTION 230400 - SHEETMETAL WORK AND RELATED ACCESSORIES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements shall govern work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 SHEETMETAL DUCTWORK

A. Contractor shall furnish and install all sheetmetal ducts as shown on the Drawings. While the Drawings shall be adhered to as closely as possible, the Engineer reserves the right to vary the run and size to meet the field conditions. Any duct size not shown shall be sized in proportion to the air carried at the same resistance in similar ductwork, or of size as directed.

B. All ductwork shall be constructed of galvanized steel gauges in accordance with the latest edition of the ASHRAE/SMACNA Guide. Bracing angles for ductwork shall be hot dipped galvanized for steel ductwork and appropriate gauge for aluminum ductwork. All ducts 18" and over in width shall be cross broken to prevent flutter.

C. Round ductwork shall be galvanized steel, spiral lock seam construction of gauges in accordance with the latest edition of ASHRAE/SMACNA guide. Fittings shall be constructed in standing seam manner. All seams, joints and collars shall be sealed in accordance with SMACNA guidelines for medium pressure ductwork to minimize noise and streaking. Ductwork and fittings shall be connected with sheetmetal couplings and sealed as to allow no leakage.

D. Ducts shall be braced as follows:

1. All ducts not exceeding 24" on one side shall be assembled with airtight slip joints.

2. 25" to 40" larger dimension 1" x 1" x 1/8" angles.

3. 41" to 60" larger dimension 1-1/2" x 1-1/2" x 1/8" angles.

4. All bracing angles shall be a minimum of 4' apart along the length of the duct.

5. Furnish and install all angles and frames for all registers, diffusers, grilles, and louvers.

6. Support horizontal ducts with hangers spaced not more than 8' apart. Place hangers at all changes in direction. Use strap hangers for cuts up to 30" wide.

E. Comply with all State and Local regulations regarding fire stopping and fireproofing. Provide fusible link fire dampers as required by State, local and Underwriter authorities and where indicated on the Drawings. Each fire damper shall be installed in such a manner as to permit ready access for inspection and maintenance purposes.

F. Provide splitter and butterfly dampers, deflecting vanes for control of air volume and direction and for balancing systems, where indicated, specified, directed and as required for the proper operation of the systems. Dampers shall be of the same material as the duct, at least one gauge heavier that the duct, reinforced where indicating quadrant and locking device for adjusting damper and locking in position.

G. Where ducts fewer than 100 square inches penetrate a rated wall, steel ductwork system of a minimum 0.0127 inch thickness shall be used.

H. All elbows shall have a minimum center line radius of 150% of duct width. If the radius is smaller, turning vanes shall be used: Turning vanes shall be double thickness, fitted into slide strips and screwed or riveted to duct below.

I. Contractor shall furnish and install all access doors in ducts as required. Access doors shall be of the pan type 1" thick and shall be provided with two galvanized hinges and suitable latched. Access doors insulated with same thickness material as duct and shall be double casing construction.

2.2 REGISTERS AND DIFFUSERS

A. Registers and diffusers shall be installed where shown on the Drawings and shall be of the sizes specified and the type indicated on the drawing schedule.

B. All registers and diffusers shall be installed in accordance with manufacturer's recommendations.

C. Registers and diffusers shall be as manufactured by Price, Carnes, Hart and Cooley or Anemostat Co.

2.3 KITCHEN EXHAUST DUCT WORK

A. Duct work or plenums for kitchen exhaust ventilators shall be constructed of not less than 16 gauge black steel or 18 gauge stainless steel with all joints and seams made with a continuous great tight weld on the external surface.

B. Duct system shall be so constructed that grease cannot become pocketed and shall slope not less than 1/4“ per lineal foot toward the ventilator hood. Duct systems shall be equipped with cleanout openings that have tight fitting doors. Doors shall be constructed of same material and gauge as duct and shall be equipped with a latching mechanism to hold the door tightly closed.

C. Kitchen exhaust system shall conform in all respects with NFPA 96

D. Insulate duct per NFPA requirements (minimum 2” calcium silicate insulation with all service jacket) and all other agencies having jurisdiction.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230400

SECTION 230410 - PIPING, FITTINGS, VALVES AND NOTES (HOT WATER)

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements shall govern work in this section. Submit shop drawings for checking and approval.

1.1 PIPING NOTES

A. The Contractor shall erect all pipe, fittings, valves, hangers, anchors, expansion joints and all accessories specified, indicated on the Drawings or required to assure proper operation of all piping systems installed under this Contract. All piping shall be maintained at a proper level to assure satisfactory operation, venting and drainage. Piping and valves in any locality where possible shall be grouped neatly and shall be run so as to avoid reducing headroom or passage clearance.

B. All piping shall be new and of the material and weight specified under various services. Steel and wrought iron pipe 2" and larger shall be seamless or lap welded. All piping shall have the maker's name and brand rolled on each length of pipe.

C. All piping, fittings, valves and strainers shall be cleaned of grease, dirt and scale before installation. All temporary pipe openings shall be kept closed during the performance of the work. The ends of all piping shall be reamed smooth and all burrs removed before installation.

D. All piping shall be cut accurately to measurements taken on the job. Offset connections shall be installed alignment of vertical to horizontal piping and where required to make a true connection and to provide for expansion. Bent or sprung pipe shall not be installed where shown on Drawings and where necessary to provide for expansion of piping. Cold spring hot lines one-half estimated distance of maximum expansion. Suitable pipe anchors shall be installed where shown or required.

E. Piping connections shall have unions where necessary for replacement and repair of equipment. Gate valves and controls valves shall be installed where shown and where necessary for proper operation and service.

F. Vertical piping shall be plumb and horizontal piping shall be parallel to walls and partitions. Piping shall be supported as required to prevent the transmission of noise and vibration.

G. Work shall include all pipe, fittings, offsets and requirements for the installation of piping of other work including ducts and conduit. Reducing fittings shall be used where pipe changes size. All piping shall be installed with ample clearance to center accurately in sleeves through floors, and walls and partitions.

H. Piping shall be downgraded to drain connections at low points and upgraded to vent connections at high points unless otherwise noted. Drain connections shall be valved and piped to a floor drain. Vent connections on mains shall be equipped with air vent valves fitted with a copper tube drip line extended to a drain outlet. Vent connections on branches and equipment shall be fitted with key type manual vent cocks.

I. Drain piping shall be installed from all equipment as required. The Contractor shall extend drain piping and turn down over floor drains.

PART 2 - PRODUCTS

2.1 PIPING (ABOVEGROUND)

A. All piping installed under this Section of the Specifications shall be in accordance with the following schedule.

1. All piping, except where indicated differently, (i.e. underground piping) shall be standard weight black steel pipe Schedule 40, Grade A53, black steel. Pipe 2” and smaller, cast iron screwed fittings. Pipe 2-1/2” and larger, steel welding fittings. Pipe and fittings as manufactured by National, Wheeling, Bethlehem or equal, manufactured in accordance with ASTM current edition. All pipes must be reamed before installation.

2. Where the Contractor elects to use copper piping, it shall be rigid Type "L" copper, Chase, Anaconda or approved equal. Fittings shall be wrot copper, Nibco, Anaconda, Mueller or approved equal. Where copper piping is used, make all additional provisions for expansion. All condensate piping shall be Type "M" copper, rigid, full size of unit drain tapping, or larger as shown on Drawings.

3. All drainage pipe lines, 2" larger except where galvanized screw pipe is shown on the Drawings or specified hereafter, shall be extra heavy cast iron soil pipe and fittings.

B. Piping installation shall be arranged for draining through accessible valves at low points.

C. Threaded short and close nipples shall be Schedule 80, extra heavy weight of the same material as pipe in system in which they are installed.

D. All bare copper pipe, tubing and fittings shall be cleaned with steel wool and all excess solder shall be removed.

2.3 VALVES

A. All valves, unless specified or noted otherwise, shall be designed for a working pressure of not less than 200 p.s.i. water or 125 p.s.i. steam with name and pressure rating of valve cast in body. All valves shall be of the same manufacturer, unless specified otherwise. Valves for cut-off shall be gate valves, unless otherwise specified.

B. All valves of same manufacturer: similar to Jenkins Bros., Walworth, Kennedy or approved equal.

C. Four inch and larger, flanged; smaller sizes, screwed.

D. All Gate and Globe valves shall be installed with handle in an upright position.

E. The Contractor shall furnish and install all valves shown on Drawings and all valves that are necessary for proper operation and maintenance of systems and equipment. All piping connections to each piece of equipment and all branch connections to mains shall have cut-off valves.

F. The following schedule of valves for steam condensate, hot water, etc. is based on Jenkins Brothers, Inc. catalog numbers (except as noted); equivalent Lukenheimer, Walworth, O-I-C, Crane Fairbanks Company valves will be acceptable.

G. Ball Valves

1. 1/4" to 2-1/2" rated for 600 p.s.i wog, with brass body, chrome plated brass ball, virgin PTFE seats, and full port with threaded or solder connections.

2. 2-1/2" and larger rated for 200 p.s.i with carbon steel body, stainless steel full port ball, RTFE seats, lever operated to 4" gear operated 6" and above, with flanged end connections.

H. Gate Valves

1. Up to 2" : Bronze gate solid wedge, inside screw traveling stem union bonnet, -Fig. 47U

2. 2-1/2" and 3" : Iron body, bronze-mounted gate, solid wedge, OS&Y rising stem, -Fig. 650-A

3. 4" and larger: Iron body, bronze-mounted gate, solid wedge, OS&Y rising stem, -Fig. 651-A

I. Globe Valves

1. Up to 2" : Bronze body, regrinding seat ring and plug, union bonnet, -Fig. 546P

2. 2-1/2" and 3" : Iron body, bronze-mounted globe and angle, regrinding disc and seat ring, OS&Y -Fig. 613

3. All gate valves 6" and larger: Fitted 3/4" by-pass globe valve.

J. Plug Valves

1. Up to 2" : Lubricated, semi-steel short pattern wrench operated, -Fig. 142

2. 2-1/2" and larger: Lubricated, semi-steel short pattern wrench operated, -Fig. 143

3. Similar to Rockwell Mgd. Co., Jenkins, Kennedy or approved equal.

K. Butterfly Valves used for chilled water, condenser water and hot water shall be the following:

1. 2-1/2" to 12" rated for 175 p.s.i bubble tight close off, 14" and larger for 150 p.s.i close-off.
2. Full lug cast iron body, aluminum bronze disc, stainless steel stem EPDM peroxide cured seat.

3. 2-14" to 6" valves to be equipped with 10 position notch plate and lever lock handle. 8" and larger with handwheel gear operator.

4. On installation, valves to be in full open position when flange bolts are tightened and stem in a horizontal position except when equipped with a chainwheel gear operator.

5. Provide chain wheel gear operator on all valves installed 7 feet or higher.

6. Valves to be designed with replaceable seat and parts kits.

7. Valve to be Bray series 31, Dezurik 637 or Demco.

L. Check Valves

1. 150 p.s.i. WSP class.

2. Up to 2" : Bronze, regrinding bronze disc, screw-in cap, -Fig. 762A

3. 2-1/2" and 3" : Iron body, bronze mounted regrinding bronze seat ring and disc, -Fig. 623

4. 4" and larger: Iron body, bronze mounted regrinding bronze seat ring and disc, -Fig. 624

M. Drain Valves: All low points shall have drain valves, with hose ends. Where 1/2" and 3/4" sizes are indicated, "Standard" hose end drain valves shall be used. Provide brass hose end drain caps at each drain valve. Where larger than 3/4" drains are shown, gate valve shall be used. Provide brass nipples and reducer from drain valve size to 3/4" terminating with 3/4" hose end drain valve and cap.

2.4 FITTINGS

A. Nipples

1. All nipples shall have clean cut threads and shall be made from new pipe, standard weight for all lengths, except that close and shoulder nipples shall be extra heavy.

2. Fittings - 2-1/2 and Smaller: All fittings shall be standard weight steam pattern gray cast iron, Grinnell, Stockholm or equal approved.

3. Fitting - 3" and Larger: The Contractor has the option to use screwed, flanged or welded fittings so long as all ASME requirements are met.

B. Joints and Unions

1. Threaded joints shall be full and clean cut. The ends of pipe shall be reamed to the full inside diameter, all burrs shall be removed and no more than three threads shall be exposed beyond fittings when made up. Joints shall be made up tight with graphite base pipe joint compound. Exposed threads of ferrous pipe shall be painted with acid-resisting paint after caulking, lampwick or other material will be allowed for correction of defective joints.

2. Flange joints shall be made up perfectly square and tight. Screwed flanges and loose flanges shall be cast iron and welding flanges shall be steel. Flanges shall be faced true and bolted up tight with 1/16" Carlock ring type gasket.

3. Bolts shall be high quality steel with hexagon nuts and heads. The Contractor shall apply grease to threads of bolt.

4. Welded joints in piping shall be by the electric or oxyacetylene process using welding rods if the characteristics similar to pipe material and as recommended by the pipe manufacturer and shall be done in accordance with the ASME Code for pressure piping. Welding shall be done by qualified welders under the requirements of the ASME Boiler and Pressure Vessel Code.

5. The pipe lengths shall be aligned with welding rings and the abutting pipe ends shall be concentric. Prior to welding, the groove and adjacent surfaces shall be thoroughly cleaned of all grease, scale, or rust. During welding, all slag, or flux remaining on the bead shall be removed before laying down the next bead. The welding metal shall be thoroughly fused with the base metal at all sections of the weld. Short lengths of pipe may be beveled on the job with oxyacetylene torch, provided all scale and oxides are removed.

6. Joints shall be butt-welded, single V-type. All fittings shall be steel welding fittings. Elbows and fittings formed with coupling or welded cut pipe sections shall not be acceptable.

7. Bonney Weldolets or welding saddles may be used for branch connections, which are less than one-half the size of the main to which they connect.

8. Ground Joint Unions, Flange Connections, Reaming & Filling Ground joint unions shall be 200 lb. s.w.p. for brass. Flanges shall be 150 lb. s.w.p. for brass, 125 lb. s.w.p. for cast iron.

9. Ground joint unions of flanges shall be used only on exposed accessible piping. Where concealed, right and left nipples and couplings must be used. Where flanged connections are used, full size gaskets must be inserted.

C. Threads: Shall be standard, clean cut and tapered. All piping shall be reamed free from burrs. All piping shall be kept free of scale and dirt. Caulking of threads will not be permitted. All piping shall be threaded and made up in accordance with the current edition of the ASA Standard Specifications for pipe threads.

D. Unions

1. Unions for use on ferrous pipe 2" and smaller shall be malleable iron with brass to iron ground joint spherical seat and threaded connections. Unions 2 1/2" and over shall be flanged type with gasket.

2. Unions for copper tubing shall be cast bronze conforming to ASA B16. The Contractor shall furnish adapters where required for copper pipe.

3. Where copper pipe connects to ferrous pipe or metals, the Contractor shall furnish EPCO isolating type dielectric unions. Plastic type isolating bushings are not acceptable.

4. Unions shall be installed wherever necessary for repair or replacement of equipment, valves, strainers, etc. Final connections to equipment shall be made in a manner that will permit removal without cutting of pipelines.

E. Solder

1. All sweat joints shall be made up with 95/5 solder.

2. Solder shall be National Lead or approved equal. Flux shall be non-toxic and non-corrosive.
3. All copper tubing ends shall be reamed, filed and cleared of burrs and rough edges. All pipes shall be reamed after cutting and threading.

F. Expansion

1. The entire piping installation shall be installed with adequate provision for expansion. No rigid connections will be permitted.

2. Branches shall be of sufficient length and have 3 elbow swings to allow for pipe expansion.

3. Provide expansion joints, guides and anchors equal to “Metra-Flex MetraLoops” where indicated on Drawings or where necessary for proper expansion compensation. Submit shop drawing.

4. Any breaks in the piping within the guarantee period due to improper provision for expansion must be replaced at the expense of this Contractor, and the conditions corrected to prevent future recurrence.

5. Any damages to surrounding areas and equipment due to this failure shall also be repaired and paid for at the expense of the Contractor.

6. Joints to have 150 psi rating, ANSI-B16.5 with liner and cover.

2.5 PIPING SLEEVES

A. Furnish sleeves built into place for all piping passing through walls, floors or building construction. Sleeves, not less than 1/2” larger in diameter than piping and its covering, if any, and extending full depth of construction pierced. Pack sleeves through walls/floors in accordance with Underwriters' Requirements.

B. Sleeves piercing exterior walls, integral waterproofed walls shall be standard weight steel piping. Furnish welded center flange buried in construction for sleeves through exterior walls below grade. At exterior walls, make pipes watertight in sleeves with oakum packing and caulked lead joints on both sides of wall. All other sleeves: Galvanized sheet steel with lock seam joints, #22 USSG for 3” or under. Sleeves for piping 4” and larger, #18 USSG.

C. Pipes passing through interior membrane waterproofed floors, cast iron flashing sleeve, with integral flashing flange and clamping ring, similar to Josam Series #1880. Adjust sleeves to floor construction with steel or wrought iron pipe nipples top and bottom, extending 3” above finished floor. Burn & J.R. Smith are equal.

D. Pipes passing through membrane waterproofed walls, cast iron flashing sleeve with internal flashing flange and clamping ring similar to Josam Series #1870. Make pipes watertight in sleeves with oakum packing and caulked lead joints. Burn & J.R. Smith are equal.

E. For flashing sleeves specified in Pars. C and D, lead flashing extended at least 10" around flashing sleeves, securely held in place by clamping device.

2.6 PIPING ENCLOSURES

A. Where concealed piping in ceilings and wall of finished spaces is not possible vertical or horizontal metal piping enclosures equal to "Sterling" model PCH (horizontal) or PCHV (vertical). Provide all required hangers, supports, corners, brackets, etc. color per Architect.

PART 3 - EXECUTION

3.1 GENERAL NOTES - PIPING NOTES, DRAINING, VENTING AND MISCELLANEOUS WATER SPECIALTIES

A. Piping shall be installed as indicated on Drawings. Elevations and dimensions are indicated as a guide only and are subject to change with actual job conditions.

B. Except for drainage piping, which shall pitch down with flow, mains shall pitch upward or be installed dead level as indicated. Horizontal runs shall be parallel to walls.

C. In general, all branch connections shall be top of bottom 45 degree or 90 degree, pitching up or down from mains.

D. Where indicated, flexible connectors shall be installed. All final connections to equipment, pumps, units, etc. shall have companion flanged, flange unions or ground joint unions. (125 lbs.)

E. All piping shall be adequately supported with approved type hangers so as to prevent absolutely any sagging of lines, or any undue strain on pipes or fittings. All pipe lines shall be capped during construction to prevent entry of dirt or other foreign material. All piping lines after erection shall be blown or flushed out to render the piping system as clean as possible before system water is added for operation.

F. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

G. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

H. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.2 DRAINING

A. All low points shall have drain valves with hose ends. Where 1/2" and 3/4" sizes are indicated, "Standard" hose end drain valves shall be used. Provide brass hose end drain caps at each drain valve. Where larger than 3/4" drains are shown, gate valve shall be used. Provide brass nipple and reducer from drain valve size to 3/4" terminating with 3/4" hose end drain valve and cap.

3.3 VENTING (For Hot Water)

A. All high points in piping shall be vented automatically with float vents. At all high points of piping, whether specifically indicated or not, provide Maid-o-Mist or B&G No. 7 or 27 Air Eliminators with shut off cock, auxiliary key vent and copper tubing overflow carried to floor along wall as indicated or directed.

3.4 WATER SPECIALTIES

A. Air Vents: Install at all high points automatic air vents to eliminate air binding. All automatic air vents shall be approved heavy duty type equipped with petcocks and tubing for manual venting. All vents installed in coils, etc. shall be of manual key operated type. All vents concealed from view shall be accessible through access doors. Vents shall be by Hoffman, Anderson or Bell & Gossett, 125 p.s.i.g. rated.

B. Pressure Gauge: Furnish and install pressure gauges on suction and discharge sides of each pump and as required to check operation of equipment; pressure gauges shall have 4-1/2"diameter dials, Ashton, Ashcroft or approved equal.

C. Install thermometers at all locations in piping system as noted on Drawings and as required to check system performance. Thermometers shall be installed at the supply and return of coils and 3-way diverting valves as manufactured by Trerice, Weksler or Moeller, with 4-1/2 inch face, cast aluminum case, chrome plated steel ring, white background with black embossed markings, glass window, stainless steel pointer, brass movement, 316 stainless steel bulb. Provide separable, universal angle sockets for all thermometers.

END OF SECTION 230410

SECTION 230415 – PIPING, FITTINGS, VALVES AND NOTES (STEAM)

PART 1 – GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements shall govern work in this section. Submit shop drawings for checking and approval.

1.1 PIPING NOTES

A. The Contractor shall erect all pipe, fittings, valves, hangers, anchors, expansion joints and all accessories specified, indicated on the Drawings or required to assure proper operation of all piping systems installed under this Contract. All piping shall be maintained at a proper level to assure satisfactory operation, venting and drainage. Piping and valves in any locality where possible shall be grouped neatly and shall be run so as to avoid reducing headroom or passage clearance.

B. All piping shall be new and of the material and weight specified under various services. Steel and wrought iron pipe 2” and larger shall be seamless or lap welded. All piping shall have the maker’s name and brand rolled on each length of pipe.

C. All piping, fittings, valves and strainers shall be cleaned of grease, dirt and scale before installation. All temporary pipe openings shall be kept closed during the performance of the work. The ends of all piping shall be reamed smooth and all burrs removed before installation.

D. All piping shall be cut accurately to measurements taken on the job. Offset connections shall be installed alignment of vertical to horizontal piping and where required to make a true connection and to provide for expansion. Bent or sprung pipe shall not be installed where shown on Drawings and where necessary to provide for expansion of piping. Cold spring hot lines one-half estimated distance of maximum expansion. Suitable pipe anchors shall be installed where shown or required.

E. Piping connections shall have unions where necessary for replacement and repair of equipment. Gate valves and controls valves shall be installed where shown and where necessary for proper operation and service.

F. Vertical piping shall be plumb and horizontal piping shall be parallel to walls and partitions. Piping shall be supported as required to prevent the transmission of noise and vibration.

G. Work shall include all pipe, fittings, offsets and requirements for the installation of piping of other work including ducts and conduit. Reducing fittings shall be used where pipe changes size. All piping shall be installed with ample clearance to center accurately in sleeves through floors, and walls and partitions.

H. Piping shall be downgraded to drain connections at low points.

PART 2 – PRODUCTS

2.1 PIPING

A. All piping installed under this Section of the Specifications shall be in accordance with the following schedule.

1. Piping for low pressure shall be standard weight black steel pipe Schedule 40, Grade A53, black steel and Schedule 80, Grade A53 for medium and high pressure. All steam condensate piping shall be Schedule 80, Grade A53. Pipe 2" and smaller, cast iron screwed fittings. Pipe 2-1/2" and larger, steel welding fittings. Pipe and fittings as manufactured by National, Wheeling, Bethlehem or equal, manufactured in accordance with ASTM current edition. All pipes must be reamed before installation.

2. All drainage pipe lines, 2" larger except where galvanized screw pipe is shown on the Drawings or specified hereafter, shall be extra heavy cast iron soil pipe and fittings.

B. Threaded short and close nipples shall be Schedule 80, extra heavy weight of the same material as pipe in system in which they are installed.

2.2 VALVES

A. All valves, unless specified or noted otherwise, shall be designed for a working pressure of not less than 200 psi water or 125 psi steam with name and pressure rating of valve cast in body. All valves shall be of the same manufacturer, unless specified otherwise. Valves for cut-off shall be gate valves, unless otherwise specified.

B. All valves of same manufacturer: similar to Jenkins Bros., Walworth, Kennedy or approved equal.

C. Four inch and larger, flanged; smaller sizes, screwed.

D. All Gate and Globe valves shall be installed with handle in an upright position.

E. The Contractor shall furnish and install all valves shown on Drawings and all valves that are necessary for proper operation and maintenance of systems and equipment. All piping connections to each piece of equipment and all branch connections to mains shall have cut-off valves.

F. The following schedule of valves for steam, condensate, etc. is based on Jenkins Brothers, Inc. catalog numbers (except as noted); equivalent Lukenheimer, Walworth, O-I-C, Crane Fairbanks Company valves will be acceptable.

G. Gate Valves

1. Up to 2" : Bronze gate solid wedge, inside screw traveling stem union bonnet, -Fig. 47U

2. 2-1/2" and 3" : Iron body, bronze-mounted gate, solid wedge, OS&Y rising stem, -Fig. 650-A

3. 4” and larger: Iron body, bronze-mounted gate, solid wedge, OS&Y rising stem, -Fig. 651-A

4. Provide chain wheel gear operator on all valves installed 7 feet or higher.

2.3 FITTINGS

A. Nipples

1. All nipples shall have clean cut threads and shall be made from new pipe, standard weight for all lengths, except that close and shoulder nipples shall be extra heavy.
2. Fittings - 2-1/2 and Smaller: All fittings shall be standard weight steam pattern gray cast iron, Grinnell, Stockholm or equal approved.
3. Fitting - 3" and Larger: The Contractor has the option to use screwed, flanged or welded fittings so long as all ASME requirements are met.

B. Joints and Unions

1. Threaded joints shall be full and clean cut. The ends of pipe shall be reamed to the full inside diameter, all burrs shall be removed and no more than three threads shall be exposed beyond fittings when made up. Joints shall be made up tight with graphite base pipe joint compound. Exposed threads of ferrous pipe shall be painted with acid-resisting paint after caulking, lampwick or other material will be allowed for correction of defective joints.

2. Flange joints shall be made up perfectly square and tight. Screwed flanges and loose flanges shall be cast iron and welding flanges shall be steel. Flanges shall be faced true and bolted up tight with 1/16" Carlock ring type gasket.

3. Bolts shall be high quality steel with hexagon nuts and heads. The Contractor shall apply grease to threads of bolt.

4. Welded joints in piping shall be by the electric or oxyacetylene process using welding rods if the characteristics similar to pipe material and as recommended by the pipe manufacturer and shall be done in accordance with the ASME Code for pressure piping. Welding shall be done by qualified welders under the requirements of the ASME Boiler and Pressure Vessel Code.

5. The pipe lengths shall be aligned with welding rings and the abutting pipe ends shall be concentric. Prior to welding, the groove and adjacent surfaces shall be thoroughly cleaned of all grease, scale or rust. During welding, all slag, or flux remaining on the bead shall be removed before laying down the next bead. The welding metal shall be thoroughly fused with the base metal at all sections of the weld. Short lengths of pipe may be beveled on the job with oxyacetylene torch, provided all scale and oxides are removed.

6. Joints shall be butt-welded, single V-type. All fittings shall be steel welding fittings. Elbows and fittings formed with coupling or welded cut pipe sections shall not be acceptable.

7. Bonney Weldolets or welding saddles may be used for branch connections, which are less than one-half the size of the main to which they connect.

8. Ground Joint Unions, Flange Connections, Reaming & Filling Ground joint unions shall be 200 lb. s.w.p. for brass. Flanges shall be 150 lb. s.w.p. for brass, 125 lb. s.w.p. for cast iron.

9. Ground joint unions of flanges shall be used only on exposed accessible piping. Where concealed, right and left nipples and couplings must be used. Where flanged connections are used, full size gaskets must be inserted.

C. Threads: Shall be standard, clean cut and tapered. All piping shall be reamed free from burrs. All piping shall be kept free of scale and dirt. Caulking of threads will not be permitted. All piping shall be threaded and made up in accordance with the current edition of the ASA Standard Specifications for pipe threads.

D. Unions

1. Unions for use on ferrous pipe 2" and smaller shall be malleable iron with brass to iron ground joint spherical seat and threaded connections. Unions 2 1/2" and over shall be flanged type with gasket.

2. Unions shall be installed wherever necessary for repair or replacement of equipment, valves, strainers, etc. Final connections to equipment shall be made in a manner that will permit removal without cutting of pipelines.

E. Expansion

1. The entire piping installation shall be installed with adequate provision for expansion. No rigid connections will be permitted.

2. Branches shall be of sufficient length and have 3 elbow swings to allow for pipe expansion.

3. Provide expansion joints, guides and anchors equal to “Flexonics” Type HCF where indicated on Drawings or where necessary for proper expansion compensation. Submit shop drawing.

4. Any breaks in the piping within the guarantee period due to improper provision for expansion must be replaced at the expense of this Contractor, and the conditions corrected to prevent future recurrence.

5. Any damages to surrounding areas and equipment due to this failure shall also be repaired and paid for at the expense of the Contractor.

6. Joints to have 150 psi rating, ANSI-B16.5 with liner and cover.

2.4 PIPING SLEEVES

A. Furnish sleeves built into place for all piping passing through walls, floors or building construction. Sleeves, not less than 1/2” larger in diameter than piping and its covering, if any, and extending full depth of construction pierced. Pack sleeves through walls/floors in accordance with Underwriters' Requirements.

B. Sleeves piercing exterior walls, integral waterproofed walls shall be standard weight steel piping. Furnish welded center flange buried in construction for sleeves through exterior walls below grade. At exterior walls, make pipes watertight in sleeves with oakum packing and caulked lead joints on both sides of wall. All other sleeves: Galvanized sheet steel with lockseam joints, #22 USSG for 3" or under. Sleeves for piping 4" and larger, #18 USSG.

C. Pipes passing through interior membrane waterproofed floors, cast iron flashing sleeve, with integral flashing flange and clamping ring, similar to Josam Series #1880. Adjust sleeves to floor construction with steel or wrought iron pipe nipples top and bottom, extending 3" above finished floor. Burn & J.R. Smith are equal.

D. Pipes passing through membrane waterproofed walls, cast iron flashing sleeve with internal flashing flange and clamping ring similar to Josam Series #1870. Make pipes watertight in sleeves with oakum packing and caulked lead joints. Burn & J.R. Smith are equal.

E. For flashing sleeves specified in Pars. C and D, lead flashing extended at least 10" around flashing sleeves, securely held in place by clamping device.

2.5 PIPING ENCLOSURES

A. Where concealed piping in ceilings and wall of finished spaces is not possible vertical or horizontal metal piping enclosures equal to "Sterling" model PCH (horizontal) or PCHV (vertical). Provide all required hangers, supports, corners, brackets, etc. color per Architect.

2.6 ESCUTCHEONS

A. Furnish tamperproof pipe escutcheons at all surfaces where exposed piping bare or covered, passes through walls, ceilings, floors or partitions.

B. Escutcheons: Stamped sheet metals, chromium plated over copper on all surfaces and satin finish on exposed side. Fasten escutcheons securely to pipe sleeves or to extensions of sleeves without any part of sleeve or extension being visible; escutcheons held in place by tamperproof screws and on covered pipe by internal spring tension, tamperproof.

C. Where sleeves or fittings project slightly from wall, partitions, floor or ceiling, provide special deep type escutcheons.

PART 3 - EXECUTION

3.1 GENERAL NOTES

A. Piping shall be installed as indicated on Drawings. Elevations and dimensions are indicated as a guide only and are subject to change with actual job conditions.

B. Mains shall pitch upward or be installed dead level as indicated. Horizontal runs shall be parallel to walls.

C. In general, all branch connections shall be top of bottom 45 degree or 90 degree, pitching up or down from mains.

D. All piping shall be adequately supported with approved type hangers so as to prevent absolutely any sagging of lines, or any undue strain on pipes or fittings. All pipe lines shall be capped during construction to prevent entry of dirt or other foreign material. All piping lines after erection shall be blown or flushed out to render the piping system as clean as possible before system water is added for operation.

END OF SECTION 230415

SECTION 230420 - SUPPORTS, SLEEVES AND PLATES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. This Contractor shall furnish and install all plates, hangers and supports for his equipment including piping, headers, fans expansion tank, ductwork, etc.

B. All ductwork, piping and equipment shall be hung or supported from structural members only.

PART 2 - PRODUCTS

2.1 PIPING, DUCTWORK AND EQUIPMENT

A. All piping shall be supported from building structure in a neat and workmanlike manner wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze hangers. Vertical risers shall be supported at each floor line with steel pipe clamps. Use of wire perforated metal to support pipes will not be permitted. Hanging pipes from other pipes will not be permitted.

B. Necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations shall be furnished and installed. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing.

C. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction, when the supported piping is hot.

D. Pipe hangers shall be as manufactured by Grinnell, whose catalog numbers are given herein, or equivalent Carpenter and Paterson, or F&S Mfg. Co.

E. Piping shall be supported as follows unless otherwise indicated on the Drawings:

1. Heating piping shall be 1-1/2 " and smaller Fig. #260 adjustable clevis hanger. 2" and larger Fig. #174 one-rod swivel roll hanger.

2. Two-rod hangers shall be used for piping close to the ceiling slab or where conditions prohibit use of other hanger types.

3. Anchors for hanger rods shall be Phillips "Red Head" self-drilling type. Anchors shall be placed only in vertical surfaces.

4. Spacing of pipe supports shall not exceed 8 feet for pipes up to 1-1/2" and 10 feet on all other piping.

5. Hangers shall pass around insulation and a 16 gauge steel protective cradle; 12" long shall be inserted between hangers and insulation. Insulation under cradle shall be high density calcium silicate or approved equal to prevent crushing.

6. All piping shall be supported to allow free movement where expanding or contracting. Pipe shall be anchored as required or directed.

7. All lateral runs of piping shall be securely supported on hangers, rolls, brackets, etc. and in manner to allow for proper expansion and elimination of vibration.

8. 2" and smaller pipe, where run on walls, shall be supported on wrought iron "J" hook brackets with anchor bolts.

9. All horizontal pipes, where run overhead or on walls, shall be supported as follows unless otherwise indicated:

   a. On adjustable steel clevis type hangers suspended on hanger rods, pipe sizes up to and including 4".

F. Space limitations in hung ceilings spaces and conditions in other locations may require use of other type of hangers than those specified above. Suitable and approved pipe hangers shall be provided for such job conditions.

G. All supports shall be fastened to structural members or additional steel supports furnished by this Contractor.

H. Hanger rods shall be steel, threaded with nuts and lock nuts sizes in accordance with the following schedule:

Pipe Size	Rod Size
3/4" to 2" inclusive	3/8"
2-1/2" and 3' inclusive	1/2"
4" and 5" inclusive	5/8"
6"	3/4"
8" to 12" inclusive	7/8"

I. Hangers for copper tubing shall be tacked up with formed lead sheet on which tubing or pipe shall be placed.

J. Where pipes pass through masonry, concrete walls, foundations, or floors, this Contractor shall set sleeves as are necessary for passage of pipes. These sleeves shall be of sufficient size to permit insulation where required to be provided around pipe passing through. This Contractor shall be responsible for exact location of these sleeves.

K. Sleeves shall not be used in any portion of building where use of same would impair strength of construction features of the building. Inserts for supporting lateral pipes and equipment shall be placed and secured to form work, and all sleeves inserts locations shall be thoroughly checked with Architect so as not to conflict with other trades.

L. Where pipes pass through floor or walls, they shall be provided with chromium plated escutcheons.

M. Anchor horizontal piping where indicated and wherever necessary to localize expansion or prevent undue strain on branches. Anchors: Heavy forged construction entirely separate from supports.

N. Anchor vertical piping wherever indicated and wherever necessary to prevent undue strain on offsets and branches. Anchors, unless otherwise noted: Heavy steel clamps securely bolted and welded to pipes. Extension ends shall bear on building construction.

O. Ducts shall be hung with 1" x 1/8" metal straps. When width of duct is less than 48", hangers shall be fastened to side of ducts. Auxiliary steel supports that may be required for all mechanical equipment shall be furnished and installed by this Contractor. All operating equipment including fans, piping, etc. shall be supported so as to produce minimum amount of noise transmission.

P. Refer to "General Conditions" as well.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230420

SECTION 230430 - INSULATION AND COVERINGS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

A. Furnish insulation for all piping, equipment and sheetmetal work as noted.

B. Insulate no piping, ducts or equipment until tested and approved for tightness. All piping and ducts shall be dry when covered. Where existing insulation has been damaged, altered of removed during the course of the work, it shall be replaced with new insulation in a neat manner to match the adjacent insulation.

C. All insulation must be done by an approved Sub-Contractor or by mechanics skilled in this line of work.

D. Fire hazard classification shall be 2550 per ASTM E-84, NFPA 255 and UL 723. Insulation shall be rated non-combustible type classified flame spread - 25, smoke developed - 50.

PART 2 - PRODUCTS

2.1 DUCTWORK (INDOOR)

A. All supply, outside air intake and exhaust (on discharge side of fan) and return (in unconditioned spaces) ductwork shall be covered with fiberglass with aluminum foil vapor barrier. All joints shall be lapped so maximum coverage is achieved.

B. All insulated ductwork shall be insulated with thick fiberglass board insulation with canvas finish in areas where ductwork is exposed.

C. Insulation thickness shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code C403.11.

D. Thermal acoustic lining of ductwork where indicated shall be 1” thickness fiberglass unless otherwise noted. The lining shall have a mat facing and shall meet the Life Safety Standards as established by NFPA 90A and 9B and conform to the requirements of ASTMC 1071.

E. Insulate Kitchen exhaust ductwork per NFPA requirements (minimum 2” calcium silicate insulation) and all other agencies having jurisdiction.

2.2 DUCTWORK (OUTDOOR)

A. All exposed ductwork shall be internally lined and sealed. All weatherproofing and external insulation by General Contractor.

B. Make proper provision with ductwork support(s) so that insulation is not crushed. All exterior ductwork must be designed with adequate slope (watershed) to prevent ponding water.

2.3 PIPING / EQUIPMENT (INDOOR)

A. All new or altered heating and chilled water system supply and return piping shall be covered with Manville Micro-Lok or equal approved fiberglass insulation with all service (factory applied) vapor retardant jacket. Seal with type H mastic.

B. Fittings shall be insulated with same material and thickness as adjoining pipe insulation and shall be pre-molded fittings or mitre cut segmental insulation wired on. Over the insulation, apply a wrapper of OCF glass cloth sealed with type H mastic. Apply aluminum bands on pipe covering in addition to self-sealing feature.

C. Insulation Material: Molded fibrous glass insulation, density not less than 4 lbs. per cubic foot.

D. Insulation Thickness: Shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code C403.11.

E. Jacket and Finish: White flame retardant type, meeting all requirements of "Fire Hazard Classification" of NFPA, similar to "Fiberglass" Type FRJ, Insul-Coustic, Johns-Manville or approved equal.

F. Insulation and Finishes for Fittings, Valves and Flanges

1. Valves, fittings and flanges other than vapor seal insulation: Insulated in same manner and same thickness as piping in which installed.

2. Use pre-molded sectional covering where available; otherwise use mitered segments of pipe covering.

3. Obtain written approval prior to using other than molded sectional covering.

G. Vapor seal Insulation for Valves, Fittings and Flanges: Same as above, except joints sealed with vapor barrier adhesive and wrapped with glass mesh tape. Each fitting shall be finished with two coats of vapor seal mastic adhesive.

H. Jacket and Finishes: Exposed fittings - 6 oz. canvas jacket adhered with lagging adhesive.

I. Concealed fittings: Standard weight canvas jacket adhered with lagging adhesive and with bands of 18 gauge copper coated steel - 2 bands at elbows, 3 at tee.

J. Insulation at Pipe Hangers

1. Where shields are specified at hangers on piping with fibrous glass covering, provide load bearing calcium silicate between shields and piping as follows:

a. For pipe covering without vapor barrier jacket, furnish at each shield 12" - long calcium silicate section with canvas section with canvas jacket continuous between shield and insulation.

b. For pipe covering with vapor barrier jacket, furnish at each shield 12" - long vapor barrier jacket section with section of fibrous glass replaced with section of calcium silicate. Vapor barrier jacket, continuous between shield and insulation for continuous vapor barrier.

K. Condensate drain piping shall be insulated with 1/2” Armacell or approved equal closed cell insulation.

L. Refrigerant piping shall be insulated with Armacell or approved equal closed cell insulation. Thickness shall be in accordance with the latest edition of the New York State Energy Conservation Code C403.11.

M. Equipment

1. Secure fibrous glass block or board insulation in place with wire or galvanized steel bands.

a. Small Areas: Secure insulation with 16 gauge wire on maximum 6” centers.

b. Large Areas: Secure insulation with 14 gauge wire or .015” thick by 1/2” wide galvanized steel bands on maximum 10” centers. Stagger insulation joints.

c. Irregular Surfaces: Where application of block or board insulation is not practical insulate with insulating cement built-up to same thickness as adjoining insulation.

2. Fill joints, voids and irregular surfaces with insulating cement to a uniform thickness.

3. Stretch wire mesh over entire insulated surface and secure to anchors with wire edges laced together.

4. Apply finishing cement, total of 1/2” thick, in 1/4” thick coats. Trowel second coat to a smooth hard finish.

5. Neatly bevel insulation around handholes, cleanouts, ASME stamp, manufacturer’s nametag and catalog number.

N. Insulated Covers for Pumps

1. Do not extend pump insulation beyond or interfere with stuffing boxes or interfere with adjustment and servicing of parts regular maintenance or operating attention.

2.4 PIPING (OUTDOOR)

A. All supply and return piping shall be or approved equal covered with insulation in accordance with the latest edition of the New York Energy Conservation code C403.11.

B. Insulation shall be complete elastomeric insulation system coupled with a multi-layered covering, resistant to ultraviolet rays and atmospheric agents. The plastic / aluminum cladding provides a secondary moisture vapor barrier to the inherently moisture-resistant closed cell foam core. The insulation cladding shall be a minimum of .016” thick. Provide 2” wide tape for seams and 8” wide tape for edges and corner with matching cladding covering. All seams and joints shall be weatherproof.

C. Insulation shall conform with ASTM C 534 Type 1, Grade 1 and shall be manufactured by K-Flex USA Model K-FLEX CLAD AL, (K-FLEX CLAD IN for extreme environmental conditions), Armacell Model ARMATUFF SA or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230430

SECTION 230440 - DAMPERS AND MISCELLANEOUS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 DAMPERS AND MISCELLANEOUS

A. Furnish and install where shown on Drawings ARROW PIN-LOCK Dampers No. OBDPL-507 (Opposed) as manufactured by the Arrow Louver & Damper Corp. of Maspeth, NY 11378, or approved equal. Frames and blades to 1/8" extruded aluminum.

B. Blades to be single unit PIN-LOCK design 6" wide, with the PIN-LOCK an integral section within the blade center axis. Frames to be a combination of 4" extruded aluminum channel and angle, with reinforcing bosses and groove inserts for vinyl seals.

C. Pivot rods to be 1/2" diameter extruded aluminum, PIN-LOCK design interlocking into blade section. Bearings to be "Double-Sealed" type with Celcon inner bearing on rod riding in Merlon Polycarbonate outer bearing inserted in frame so that outer bearing cannot rotate.

D. Blade linkage hardware is to be installed in angle or channel frame section out of air stream. All hardware to be of non-corrosive reinforced material or to be cadmium plated.

E. Rod bearing to be designed for minimum air leakage by means of overlapping design and by extruded vinyl seals to fit into integral ribbed groove inserts in both frames and blades. All dampers in excess of 10 sq. ft. free area to have reinforced corners by means of gusset plates.

F. Dampers shall be sized by the Control Manufacturer to properly control the flow of air and ensure minimum air stratification in mixing applications. Sizing shall be submitted for approval with information similar to that submitted on valve when sizing valve.

2.2 FIRE DAMPERS

A. Dampers shall be multi blade construction UL labeled and be installed in accordance with UL 555, with breakaway connections. The units shall have stainless steel actuator springs with locking devices for horizontally mounted type.

2.3 COMBINATION FIRE / SMOKE DAMPERS

A. Furnish and install at locations shown on Drawings, or as described in schedules, combination fire smoke dampers.

B. Frame shall be a minimum of 16 gauge galvanized steel formed into a structural hat channel reinforced at corners for added strength. The blades shall be airfoil shaped single-piece hollow construction with 14 gauge equivalent thicknesses. Blade action shall be opposed. Bearings shall be stainless steel sleeve turning in an extruded hole in the frame for long life. Galvanized bearing shall not be acceptable.

C. Blade edge seals shall be silicone rubber and galvanized steel mechanically locked into blade edge (adhesive or clip fastened seals shall be acceptable) and shall withstand a minimum of 450 degrees F. (232 degrees C.) Jamb seals shall be non-corrosive stainless steel flexible metal compression type to further ensure smoke management.

D. Each combination fire/smoke damper shall be classified for use for fire resistance ratings of less than 3 hours in accordance with UL Standard 555, and shall further be classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems in accordance with the latest version of UL555S, and bear a UL label attesting to same. Damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers, required by this Specification. Testing and UL qualifying a single damper size is not acceptable. The leakage rating under UL555S shall be leakage Class I (4 c.f.m./sq. ft. at 1" w.g. and 8 c.f.m./ft. at 4" w.g.).

E. As part of UL qualification, dampers shall have demonstrated a capacity to operate (to open and close) under HVAC system operating conditions, with pressures of at least 4" w.g. in the closed position, and 4000 f.p.m. air velocity in the open position.

F. In addition to the leakage rating already specified herein, the dampers and their actuators shall be qualified under UL555S to an elevated temperature of 350 degrees F. (177 degrees C.). Appropriate electric actuators (equal to Ruskin model MA) shall be installed by the damper manufacturer at time of damper fabrication. Damper and actuator shall be supplied as a single entity, which meets all applicable UL555S qualifications for both dampers and actuators. Damper and actuator assembly shall be factory cycled 10 times to assure operation.

G. Manufacturer shall provide factory assembled sleeve of 17" minimum length (Contractor to verify requirement). Factory supplied caulked sleeve shall be 20 gauge for dampers through 84" wide and 18 gauge above 84" wide.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.

B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION 230440

SECTION 230460 - AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 QUALIFICATIONS OF BIDDER

A. All bidders must be building automation contractors in the business of installing direct digital control building automation systems for a minimum of 10 years.

B. All bidders must have an office in the within 50 miles of jobsite.

C. All bidders must be authorized distributors or branch offices of the manufacturers specified.

D. All bidders must have a trained staff of application Engineers, who have been certified by the manufacturer in the configuration, programming and service of the automation system.

1.2 SCOPE OF WORK

A. This Contractor shall furnish an electronic system of temperature controls as manufactured by Johnson Controls, Inc.. The District has standardized on this manufacturer. All submitted controls shall be directly compatible with existing hardware and software without patch panels or translators or any kind. The ATC Sub-Contractor shall be subject to the District's approval.

B. The BAS Contractor shall review and study all HVAC Drawings and the entire Specification to familiarize himself with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc. to be provided.

C. Prior to commencement of schedule programming meet with Owner to discuss block/individual scheduling of system/equipment and alarm protocols. Review equipment designations and graphics screens to be provided. Take minutes of this meeting and issue them to the Construction Manager/Owner's representative.

D. RS-232 Drivers or Hardware Translators: All DDC components shall communicate on existing Level 1 or Level 2 networks in native mode.

E. The new installed system shall communicate to the existing graphic Workstation. All new graphics shall match established standards of the existing District system.

F. All temperature control wiring regardless of voltage shall be done by this Contractor. This shall include power wiring of control panels/components from available spare circuits in electrical panels. The automatic temperature control manufacturer shall provide wiring diagrams, field supervision and one (1) year guarantee on the installed DDC system and three (3) year factory warrantee on all control equipment manufactured by the DDC manufacturer.

G. Thermostats, temperature sensors, heating control devices, etc. are indicated on the Drawings in general. Provide any additional devices required to carry out project intent as herein described.

H. Thermostats/Temperature sensors in areas subject to vandalism shall have in addition separately mounted extra heavy guards. Submit sample.

I. Contractor shall include all new heating control devices, thermostats, etc. indicated on Drawings or that is part of a new system.

J. Contractor shall furnish all necessary electrical controls, motor starters, switches, etc. for proper operation of equipment furnished by him under this Contract, and as herein noted.

K. Point and component lists are to be used as a guide. If the sequence of operation requires additional points/control devices, this Contractor shall be responsible for providing same.

L. All control system components installed shall be manufactured by the DDC system manufacturer.

M. Communications cabling shall be run in hallways above hung ceiling with plenum cable and wiremold where exposed.

N. Removals shall include switches, relays, electric components not required for the new intent. Do not leave behind items with no function. Provide appropriate blanking plates/patching where removals occur in finished spaces.

O. Provide services and manpower necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and Owner's representative.

1.2 SOFTWARE CODE

A. Owner shall be furnished with a complete, hard-bound copy of all installed software code. Final payment shall be contingent upon this requirement being met.

PART 2 - PRODUCTS

2.1 CONTROL VALVES (With Electric Actuator)

A. Provide automatic control valves suitable for the specified controlled media (water or glycol). Provide valves, which mate and match the material of the connected piping. Equip control valves with the actuators of required input power type and control signal type to accurately position the flow control element and provide sufficient force to achieve required leakage specification.

B. Control valves shall meet the heating and cooling loads specified, and closes off against the differential pressure conditions within the application. Valves should be sized to operate accurately and with stability from 10% to 100% of the maximum design flow.

C. Trim material shall be stainless steel for hot water and high differential pressure applications.

D. Electric actuation should be provided on all terminal unit reheat applications.

2.2 DAMPERS (With Electric Actuators)

A. Automatic dampers, furnished by the Building Automation Contractor shall be single or multiple blade as required. Dampers are to be installed by the HVAC Contractor under the supervision of the BAS Contractor. All blank-off plates and conversions necessary to install smaller than duct size dampers are the responsibility of the Sheetmetal Contractor.

B. Damper frames are to be constructed of 13 gauge galvanized sheet steel mechanically joined with linkage concealed in the side channel to eliminate noise as friction. Compressible spring stainless steel side seals and acetyl or bronze bearings shall also be provided.

C. Damper blade width shall not exceed eight inches. Seals and 3/8 inch square steel zinc plated pins are required. Blade rotation is to be parallel or opposed as shown on the schedules.

D. For high performance applications, control dampers will meet or exceed the UL Class I leakage rating.

2.3 DAMPER ACTUATORS

A. Electronic Actuators: The actuator shall be direct coupled over the shaft, enabling it to be mounted directly to the damper shaft without the need for connecting linkage. The actuator shall have electronic overload circuitry to prevent damage. For power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing. Non-spring return actuators shall have an external manual gear release to allow positioning of the damper when the actuator is not powered.

B. All valves shall be fully proportioning, unless otherwise specified, quiet in operation, and shall be arranged to fail safe, in either a normally open or normally closed position, in the event of power failure. The open of closed position shall be as specified or as required to suit job conditions. All valves shall be capable of operating at varying rates of speed to correspond to the exact dictates of the controller and variable load requirements.

C. Where valves operate in sequence with other valves or damper operators, provide on each valve a pilot positioner to provide adjustable operating ranges and starting points and positive close off at the required control signal pressure. Positioners must be directly connected to the valve stem. Ratio relays are not acceptable.

D. Valves shall be sized by the Temperature Control Manufacturer and guaranteed to meet the heating or requirements as specified and indicated on the Drawings. Unless otherwise specified, all shall conform to the requirements herein specified for the piping system in which they are installed.

2.4 CENTRAL CONTROL PANEL

A. Integrate new controls into existing central control touch screen panel. This central panel will allow for time clock scheduling, setpoints, monitoring of points and alarm. All freezestats will be reset manually at the central panel. All alarms will be displayed and reset manually at central panel.

B. All exhaust fans shall be controlled by the central control panel.

C. Central control panel shall be connected to existing District IT Network. District shall provide data drop.

2.5 LOCAL STAND-ALONE CONTROLLERS

A. Provide local stand-alone controllers as required. These controllers will, through DDC programs control local units. They shall be networked together to central touch screen panel.

2.6 ENCLOSURES

A. All control components shall be mounted in NEMA-1, lockable, hinged enclosures.

PART 3 - EXECUTION

3.1 GENERAL

A. All DDC Controllers shall be networked to Central Communications controller.

B. Existing Front End Workstation shall be configured for School access. Text/Graphic screens for each system shall match existing.

C. Communications cabling shall be run in hallways above hung ceiling with plenum cable and wiremold where exposed.

3.2 CONTRACTOR RESPONSIBILITIES

A. General: The Contractor or a Sub-Contractor shall perform installation of the building automation system. However, all installation shall be under the personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training and warranty requirements for the project be delegated to a Sub-Contractor.

B. Demolition: Remove controls, which do not remain as part of the building automation system, all associated abandoned wiring and conduit and all associated pneumatic tubing. The Owner will inform the Contractor of any equipment, which is to be removed, that will remain the property of the Owner. The Contractor will dispose of all other equipment that is removed.

C. Access to Site: Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's representative.

D. Code Compliance: All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations. Should any discrepancy be found between wiring Specifications in Division 17 and Division 16, wiring requirements of Division 17 will prevail for work specified in Division 17.

E. Cleanup: At the completion of the work, all equipment pertinent to this Contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this Contract. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

3.3 WIRING, CONDUIT, TUBING AND CABLE

A. All wire will be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr.	Per Mfr.

B. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.

C. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.

D. Where wiring is required to be installed in conduit, EMT shall be used. Conduit shall be minimum 1/2 inch galvanized EMT. Setscrew fittings are acceptable for dry interior locations. Watertight compression fittings shall be used for exterior locations and interior locations subject to moisture. Provide conduit seal off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.

E. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.

F. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasket covers.

G. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management system shall be in conduit.

H. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.

3.4 HARDWARE INSTALLATION

A. Installation Practices for Wiring and Tubing

1. All controllers are to be mounted vertically and per the manufacturer's installation documentation.

2. The 120 VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run will include a separate hot, neutral and ground wire. The ground wire will terminate at the breaker panel ground. This circuit will not feed any other circuit or device.

3. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.

4. Wires are to be attached to the building proper at regular intervals such that wiring does not drop. Wires are not to be affixed to or supported by pipes, conduit, etc.

5. Wiring in finished areas will be concealed in ceiling cavity spaces, plenums, and furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.

6. Wiring, in non-finished areas where possible, will be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.

7. Wires are to be kept a minimum of three (3) inches from hot water or condense piping.

8. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.

B. Installation Practices for Field Devices

1. Well-mounted sensors will include thermal conducting compound within the well to insure good heat transfer to the sensor.

2. Actuators will be firmly mounted to give positive movement and linkage will be adjusted to give smooth continuous movement throughout 100 percent of the stroke.

3. Relay outputs will include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.

4. Water line mounted sensors shall be removable without shutting down the system in which they are installed.

5. For duct static pressure sensors, the high-pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low-pressure port shall be left open to the plenum area at the point that the high-pressure port is tapped into the ductwork.

6. For building static pressure sensors, the high-pressure port shall be inserted into the space via a metal tube. Pipe the low-pressure port to the outside of the building.

C. Enclosures

1. For all I/O requiring field interface devices, these devices, where practical, will be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure, which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.

2. FIP's shall contain power supplies for sensors, interface relays and Contractors, safety circuits, and I/P transducers.

3. The FIP enclosure shall be of steel construction with baked enamel finish; NEMA 1 rated with a hinged door and keyed lock. The enclosure will be sized for 20% spare mounting space. All locks will be keyed identically.

4. All wiring to and from the FIP will be to screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.

5. All outside mounted enclosures shall meet the NEMA-4 rating.

6. The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

D. Identification

1. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with As-Built Drawings.
2. All field enclosures, other than controllers, shall be identified with a Bakelite nameplate. The lettering shall be in white against a black or blue background.
3. Junction box covers will be marked to indicate that they are a part of the BAS system.

4. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with nameplates.

5. All I/O field devices inside FIP's shall be labeled.

E. Control System Switch-Over

1. Demolition of the existing control system will occur after the new temperature control system is in place including new sensors and new field interface devices.

2. Switch over from the existing control system to the new system will be fully coordinated with the Owner. A representative of the Owner will be on site during switch over.

3. The Contractor shall minimize control system downtime during switch over. Sufficient installation mechanics will be on site so that the entire switch over can be accomplished in a reasonable time frame.

F. Location

1. The location of sensors is per Mechanical and Architectural Drawings.

2. Outdoor air sensors will be mounted on the north building face directly in the outside air. Install these sensors such that the effects of heat radiated from the building or sunlight is minimized.

3. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

3.5 SOFTWARE INSTALLATION

A. General: The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.

B. Database Configuration: The Contractor will provide all labor to configure those portions of the database that are required by the points list and sequence of operation.

C. Color Graphic Slides: Unless otherwise directed by the Owner, the Contractor will provide color graphic displays as depicted in the Mechanical Drawings for each system and floor plan. For each system or floor plan, the display shall contain the associated points identified in the point list and allow for set point changes as required by the Owner.

D. Reports - The Contractor will configure a minimum of 6 reports for the Owner as listed below:

1. Central Plant Status Report
2. Air Handler Status Report
3. Energy Consumption Report
4. Space Temperature Report
5. Specialty Equipment Status Report

E. Documentation - As-built software documentation will include the following:

1. Descriptive point lists
2. Application program listing
3. Application programs with comments
4. Printouts of all reports
5. Alarm list
6. Printouts of all graphics

3.6 COMMISSIONING AND SYSTEM STARTUP

A. Point-to-Point Checkout
Each I/O device (both field mounted as well as those located in FIP's) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the Owner or Owner's representative.

B. Controller and Workstation Checkout
A field checkout of all controllers and front-end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the Owner or Owner's representative by the completion of the project.

C. System Acceptance Testing

1. All application software will be verified and compared against the sequences of operation. Control loops will be exercised by inducing a setpoint shift of at least 10% and observing whether the system successfully returns the process variable to setpoint. Record all test results and attach to the Test Results Sheet.

2. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit a Test Results Sheet to the Owner.

3. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the Owner.

4. Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.

3.7 SEQUENCES OF OPERATION

A. VRF Heat Recovery System
1. Point List

a. Space Temperature
b. Occupied/Unoccupied
c. VRF Space Temperature Setpoint
d. VRF Indoor Mode (Heating/Cooling)
e. VRF Indoor Unit fan speed
f. DOAS/Energy Recovery Unit Status
g. Baseboard Fin Tube/Cabinet Heater/Convector Control Valve Status (if applicable)
h. VRF Outdoor Mode/status
(Provide all required hardware and software to interface the BMS with the VRF system.)

2. Sequence of Operation
a. Unoccupied Mode: Cooling shall not operate. Baseboard radiation/cabinet heater/convector (if applicable) shall operate as Stage 1 heating. Room VRF heat recovery heating shall operate as stage 2 as required to satisfy space temperature setback setpoint.

b. Occupied Mode: Heating or cooling shall operate as required based upon its own packaged controls integrated with 3rd party thermostat to maintain thermostat setpoint. Baseboard radiation/cabinet/heater/convector shall operate as Stage 1 heating. Room VRF heat recovery heating shall operate as Stage 2 as required to maintain space thermostat setpoint. Heat recovery mode shall operate, providing heating or cooling as required. Unoccupied/Occupied scheduling will be via BMS.

c. Alarms shall be generated at Operator's Workstation.

B. Indoor DOAS Unit
1. Point List
a. Space Temperature
b. Supply Fan ECM (Speed and Status)
c. OA, SA Temperatures
d. Respective VRF Outdoor Unit Status
e. OA, Damper Modulation
f. VRF DX Heating/Cooling Coil Status
g. Dirty Filter Status
h. Relative Humidity (Supply Air)
i. Electrical Pre-heating Coil Status
2. Sequence of Operation

a. Unoccupied: In this mode:
Supply fan off, OA damper closed, perimeter radiation shall be stage 1 heat. If additional heat is required, VRF system shall operate as stage 2 to maintain night setback temperature 65°F (adj.).

b. Occupied: In this mode

i. Supply fan will start and ramp up slowly to the preset speed via ECM. The OA damper shall open. Minimum discharge air temperature shall be 72 degrees F (adj.).

ii. Perimeter Radiation valves will be the first stage of heating and open as needed to maintain the space temperature setpoint (adj.). Should additional heating be required the VRF system shall be energized as Stage 2. The VRF air source outdoor unit serving the indoor ventilation unit shall operate as required to maintain the discharge air setpoint temperature 72° adjustable if additional heat is required, electric Pre-heater will operate as required to maintain discharge setpoint.

iii. VRF direct expansion heat recovery system shall operate as needed to maintain occupied cooling setpoint (adjustable). Hot gas reheat shall maintain relative humidity in discharge air to 60 % RH (adjustable).

iv. An adjustable dead band offset will prevent short cycling.

v. Minimum outdoor air shall be as scheduled on drawings.

c. Alarms: In this mode:

i. Should the command not equal the status within 90 seconds from start-up an alarm will be generated at the operator's workstation.

ii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's workstation.

d. Economizer - In this mode:

i. An enthalpy calculation shall be used to determine if the system shall run in this mode. Unit shall operate according to its own packaged controls when outdoor conditions are favorable.

ii. When in this mode, mechanical cooling shall stop, and the economizer system shall be enabled.

C. Fin-Tube Radiation, Convectors, Radiators

1. Point List
   a. Space Temperature
   b. Valve Modulation

2. Sequence of Operation

   a. Unoccupied Mode (Heating Season): Modulate control valve to maintain night setback temperature set-point (adjustable).

   b. Occupied Mode (Heating Season): Modulate control valve to maintain daytime temperature set-point (adjustable). Interface with second stage heating.

   c. Alarms: In this mode: Should space temperature fall out of range by 5°F (high/low) an alarm will be generated at the operator's workstation.

   (Provide all required hardware and software to interface the baseboard with the VRF system through the BMS.)

D. Exhaust Fans

1. Point List
   a. Fan Start/Stop
   b. Fan Status

2. Sequence of Operation
   a. Unoccupied Mode: Fans Off, Dampers Closed.
   b. Occupied Mode: Fans On, Dampers Open.
   c. Alarms generated at operator's workstation: Exhaust Fan Status.

E. Indoor Energy Recovery Ventilation Units

1. Point List
   a. Supply Fan Status
   b. Exhaust Fan Status
   c. OA, EA, Air Temperatures
   d. OA, EA, Damper
   e. Discharge Air Temperature
   f. Heating Coil Status
   g. VRF D/X Heating/Cooling Coil Status
   h. Respective VRF Outdoor Unit Status
   i. Energy Recovery Wheel VFD Speed Status
   j. Dirty Filter Status
   k. Freeze Stat

2. Sequence of Operation

   a. Unoccupied - In this mode:
      Supply and Exhaust fans off, OA and EA dampers closed. The AHU shall start and run as stage1 to maintain the night setback temperature (60°F). The respective outdoor VRF unit shall operate as required for all systems.

   b. Occupied - In this mode:
      i. The OA and EA dampers will open and thru a hard wired interlock the Supply and Exhaust fans will start.
      ii. Energy transfer will be both sensible and latent energy between air streams. Latent energy transfer media transfer will be accomplished by direct water vapor transfer from one air stream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.
      iii. The heating coil shall operate as required to maintain occupied heating discharge setpoint (72˚F adjustable) as sensed by the duct discharge temperature sensor. If additional heat is required, the respective VRF unit shall operate as required to maintain the occupied heating discharge set point.
      The respective outdoor VRF unit shall operate as required to maintain occupied heating or cooling discharge setpoint (72˚F adjustable) as sensed by the duct discharge temperature sensor.
      iv. An adjustable dead band offset will prevent short cycling.

c. Alarms: In this mode:
   i. Should the command not equal the status within 90 seconds from start-up an alarm will be generated at the operator's workstation.
   ii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's workstation.

d. Economizer - In this mode:
   i. An enthalpy calculation shall be used to determine if the system shall run in this mode. Unit shall operate according to its own packaged controls to control the wheel operation and speed when outdoor conditions are favorable.
   ii. When in this mode, the heat transfer wheel shall stop, mechanical cooling shall stop, and the economizer system shall be enabled. The ERU heat transfer wheel rotation shall stop in economizer mode.

F. Space Temperature Setpoints

1. Heating mode
   a. Occupied: Temperature setpoints are adjustable. Temperature setpoint shall be maximum 72 degrees F.
   b. Unoccupied: Temperature setpoints are adjustable. Temperature setpoint shall be minimum 55 degrees F.
2. Cooling mode
   a. Occupied: Temperature setpoints are adjustable. Temperature setpoint shall be minimum 78 degrees F.
   b. Unoccupied: Temperature setpoints are adjustable. Temperature setpoint shall be maximum 85 degrees F.

G. Packaged Rooftop Units

1. Point List
   a. Supply Fan VFD (Speed and Status).
   b. Exhaust Fan VFD (Speed and Status).
   c. Energy Recovery Wheel VFD (Speed and Status).
   d. Space Temperature.
   e. Space Temperature Setpoint(s).
   f. OA, EA, RA and Mixed Air Temperatures.
   g. Hot Water or Steam Heating Coil Valve(s) Modulation.
   h. OA, EA, RA Damper Modulation.
   i. Freeze-stat.
   j. Discharge Temperature.
   k. DX Cooling Start/Stop/Status.
   l. Outdoor CO2 Level.
   m. Space CO2 Level.
   n. Perimeter Radiation/Unit Heater Status (As applicable)
   o. Heat Recovery Wheel Status
   p. DX Heating Star/Stop/Status (Bell MS Only)
   q. Relative Humidity
   r. Hot Gas Reheat (HS Only)

2. Sequence of Operation
   a. Unoccupied: In this mode:
      Supply and Exhaust fans off, OA and EA dampers closed. Upon a call for heat, the perimeter radiation shall operate to satisfy the temperature setpoint (where applicable). If required, the supply fan cycles on and heating coil valve modulates to maintain 55°F space temperature (adjustable).
   b. Morning Warm-up: During the heating season, a warm-up mode will be invoked if the return air temperature is below 60°F (adj.) upon unit start-up. In this mode:
      i. The OA and EA dampers will open and thru a hard wired interlock the supply and exhaust fans will start. Fans will slowly ramp up to preset speed. The warm-up program will reset the Heating Coil supply air temperature setpoint to 80°F (adj.). DX heating coil (where applicable) shall modulate to maintain set point temperature. Should additional heating be required, the hot water or steam Heating Coil valve will modulate to maintain the supply air temperature setpoint. The supply air setpoint will be reset linearly and inversely from 80°F (adj.) to 70°F (adj.) as the return air temperature increases from 60°F to 70°F (adj.).
      ii. Once the return air has reached 70°F (adj.) the RTU will be controlled as described in the occupied mode.
      iii. Note: the energy recovery wheel will be on when the unit is on and rotate as needed to maintain exhaust air temperature. Energy wheel freeze protection is integral to the unit.
      iv. Perimeter Radiation/Unit heater (if applicable) – will be the first stage of heating and will open to bring room up to occupied setpoint (adjustable). The RTU will work in sequence to maintain the heating space temperature setpoint.

   c. Cool Down: During the cooling season, a cool-down mode will be invoked if the return air temperature is above 80°F (adj.) upon unit start-up. In this mode:
      i. The cool-down program will reset the supply air temperature setpoint to 55°F (adj.)
      ii. The OA and EA dampers will open, OA and EA bypass dampers will be closed, RA damper open,
      iii. The direct expansion cooling system shall operate to maintain the supply air temperature setpoint. The supply air setpoint will be reset linearly and inversely from 55°F (adj.) to 70°F (adj.) as the return air temperature decreases from 80°F to 70°F (adj.).
      iv. Once the return air has reached 70°F (adj.) the RTU will be controlled as described in the occupied mode.
      v. Note: the energy recovery wheel will be on when the unit is on and rotate as needed to maintain exhaust air temperature. Energy wheel freeze protection is integral to the unit.
      vi. Perimeter Radiation (if applicable) –will be closed.

d. Occupied: In this mode:
The OA and EA dampers will open, OA and EA bypass dampers will be closed, RA damper closed;
   i. Supply fan will start and ramp up slowly to its' preset speed via VFD. The return fan will follow and track the supply fan as needed.
   ii. Perimeter radiation valves\unit heater (if applicable) will be the first stage of heating and open as needed to maintain the space temperature setpoint (adj.). Should additional heating be required the RTU will modulate the heating coil(s) to maintain the heating setpoint (adjustable).
   iii. Direct expansion cooling system shall operate as needed to maintain occupied cooling setpoint (adjustable) and relative humidity 60%RH (adj.). Hot gas reheat shall operate as required to maintain cooling system with relative humidity setpoint. Where HGRH is not available, hot water coil shall modulate as required to maintain setpoint.
   iv. DX heating coil (where applicable) shall modulate as required to maintain occupied heating setpoint. Should additional heat be required hot water or steam valve will modulate as needed to maintain occupied heating setpoint (adjustable).
   v. An adjustable dead band offset will prevent short cycling.
   vi. Note: the energy recovery wheel will be on when the unit is on and rotate as needed to maintain exhaust air temperature (by others). Energy wheel freeze protection is integral to the unit.

e. Economizer Mode: In this mode:

   i. An enthalpy calculation shall be used to determine if the system shall run in this mode. Unit shall operate according to its own packaged controls to control the wheel operation and speed when outdoor conditions are favorable.
   ii. When in this mode, the heat transfer wheel shall stop, mechanical cooling shall stop, and the economizer system shall be enabled. The ERU heat transfer wheel rotation shall stop in economizer mode.
   i. This will be the first stage of cooling should additional cooling be required the mechanical cooling shall operate as needed.
   ii. Note: the energy recovery wheel will be off during economizer mode. Energy wheel freeze protection is integral to the unit.

f. Alarms: In this mode:

   i. The freezestat mounted after the hot water coil will protect the water coils from freezing. Should the freezestat go into alarm the supply and return fans will shut off. The OA and EF, dampers will be closed. The OA and EA bypass dampers will be closed. The RA damper shall be open. The hot water coil valve will be open. An alarm will be generated at the operators work station. Note: the freezestat will be able to be reset from the operator's work station.

ii. Should the command not equal the status within 90 seconds from start-up an alarm will be generated at the operator's work station.

iii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's work station.

g. Demand Control Ventilation:

i. Ventilation method shall be by demand controls. There shall be no provision to remove CO2 by any other method other than dilution. Prior to space occupancy, a preoccupancy purge cycle shall be initiated for a minimum 30 minutes. Fans shall start and run and the outdoor air intake rate shall ramp up to 100 percent of unit capacity. Upon conclusion of space occupancy, a post occupancy flush cycle shall occur. The fans shall run and the outdoor air intake rate shall ramp up to 100 percent of the unit capacity until indoor CO2 concentrations in the space are reduced to outdoor air levels. Upon such occurrence, the fans shall shutdown. During occupancy, the outdoor air damper shall start to modulate open beyond the minimum setpoint, starting at an interior CO2 concentration of not greater that 100 PPM over that of the outdoor air concentration. The outdoor air damper shall be open for full occupancy when CO2 concentrations reach the upper limit of 200 PPM over that of the outdoor air. The economizer system shall override the CO2 control system when conditions permit free cooling of the space.

h. Heat Recovery:

i. The heat recovery wheel shall operate whenever the unit is operating in the Occupied mode, according to its own packaged controls.

H. Air Handling Unit (SEVEN BRIDGES ONLY)

1. Point List
   a. Supply Fan Status
   b. Return Fan Status
   c. SA, RA Air Temperatures
   d. HW Coil Valve Status
   e. D/X Cooling/Heating Coil Status
   f. Respective VRF Outdoor Unit Status
   g. Dirty Filter Status
   h. Space Temperature

2. Sequence of Operation

a. Unoccupied Mode: Cooling shall not operate. Air handling unit shall operate as Stage 1 Heating. Fan shall energize and hot water coil valve shall modulate as required as Stage 1 heating to maintain the unoccupied space temperature setpoint. Should additional heating be required, D/X coil shall modulate as required as Stage 2 to maintain the unoccupied space temperature setpoint.

b. Occupied Mode: Fan shall energize and hot water coil valve shall modulate as required as Stage 1 Heating to maintain the occupied space temperature setpoint. Should additional heating be required, D/X coil shall modulate as required as Stage 2 Heating to maintain the occupied space temperature setpoint. During cooling, the D/X coil shall modulate as required to maintain the occupied space temperature setpoint.

c. Alarms: In this mode:
   i. Should the command not equal the status within 90 seconds from start-up an alarm will be generated at the operator's workstation.
   ii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's workstation.

I. Packaged Rooftop DOAS Unit

1. Point List
   a. Space Temperature
   b. Supply Fan VFD (Speed and Status)
   c. Exhaust Fan VFD (Speed and Status)
   d. Energy Recovery Wheel VFD (Speed and Status)
   e. OA, EA, SA Temperatures
   f. OA, EA Damper Modulation
   g. Return/Recirculation Air Damper Position
   h. DX Heating/Cooling Mode
   i. Dirty Filter Status
   j. Relative Humidity (Supply Air)
   k. Heating Coil Status

2. Sequence of Operation

   a. Unoccupied: In this mode:
   Supply and Exhaust fans off, OA and EA dampers closed. If the unoccupied average space temperature is not maintained by the respective baseboard radiation, or VRF system, the rooftop ventilation unit shall cycle on in the recirculation mode (return air damper open). Upon satisfaction, the rooftop unit shall stop until the next cycle, if required.

   b. Warm-up: During the heating season, a warm-up mode will be invoked if the return air temperature is below 60°F (adj.) upon unit start-up. In this mode:
      i. The OA dampers will open and through a hard wired interlock and the supply fan will start. Fan will slowly ramp up to preset speed. The warm-up program will reset the heating supply air temperature set point to 80°F (adj.). The heating will modulate to maintain the supply air temperature setpoint. The supply air setpoint will be reset linearly and inversely from 80°F (adj.) to 72°F (adj.) as the return air temperature increases from 60°F to 72°F (adj.)
      ii. Once the return air has reached 72°F (adj.) the temperature shall be controlled as described in the occupied mode.

c. Occupied: In this mode
   i. Supply and exhaust fans will start and ramp up slowly to the preset speed via VFD. The return fan will follow and track the supply fan as needed. The OA and EA dampers shall open. Minimum discharge air temperature shall be 72 degrees F.
   ii. Perimeter Radiation valves will be the first stage of heating and open as needed to maintain the space temperature setpoint (adj.). Should additional heating be required the VRF system shall be energized as Stage 2. The rooftop ventilation unit shall operate to maintain the heating setpoint by raising the discharge air temperature as Stage 3.
   iii. VRF direct expansion heat recovery system shall operate as needed to maintain occupied cooling setpoint (adjustable). Hot gas reheat shall maintain relative humidity in discharge air to 60 % RH (adjustable).
   iv. An adjustable dead band offset will prevent short cycling.
   v. Note: the energy recovery wheel will be on when the unit is on and rotate as needed to maintain exhaust air temperature. Energy wheel freeze protection is integral to the unit.
   vi. Minimum outdoor air shall be as scheduled on drawings.

d. Alarms: In this mode:

   i. Should the command not equal the status within 90 seconds from start-up an alarm will be generated at the operator's workstation.
   ii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's workstation.

e. Economizer - In this mode:

   i. An enthalpy calculation shall be used to determine if the system shall run in this mode. Unit shall operate according to its own packaged controls to control the wheel operation and speed when outdoor conditions are favorable.
   ii. When in this mode, the heat transfer wheel shall stop, mechanical cooling shall stop, and the economizer system shall be enabled. The heat transfer wheel rotation shall stop in economizer mode.

J. Multi-Zone HVAC Units (Coil Control Valve)

1. Point List

   a. Space Temperature (See Drawings for Zone quantity)
   b. Discharge Air Temperature
   c. Freezestat Status
   d. Fan Start/Stop
   e. Fan Status
   f. Zone Damper Modulation (See Drawings for Zone quantity)
   g. Heating Valve Modulation

2. Sequence of Operation

a. Units shall be started and stopped via the Central Control Panel.

b. When the supply fan is off, the heating coil valve shall be under control of the low limit thermostat.

c. The zone requiring the most heating shall reset the heating coil discharge controller inversely with changes in space temperature and modulate the heating coil valve to maintain its setting.

d. Low Limit Protection: Manual reset type low limit thermostat located at the heating coil discharge shall stop the supply and associated exhaust fan and print an alarm message in the event that the temperature leaving the heating coil drops below 40 degrees F., (adjustable). Upon shut down of the unit the control valve to the hot water coil shall fully open. Upon reset fans shall sequence on to avoid power surges.

K. HV Unit with Radiation

1. Point List

a. Space Temperature
b. Discharge Temperature
c. Freezestat Status
d. Fan Start/Stop
e. Hot Water Valve Modulation
f. Radiation Valve Modulation

2. Sequence of Operation

a. Unoccupied Mode: The radiation valve (where applicable) shall modulate to maintain night setback setpoint. Should the radiation alone fail to maintain the setpoint, the unit fan shall be energized.

b. Occupied Mode: Unit fan shall run continuously, radiation (where applicable) and unit coil valve shall modulate open. Should room temperature continue to rise past setpoint, radiation (where applicable) and unit coil valves shall modulate closed. (Radiation valve shall lead). As room temperature decreases the reverse shall occur. A manual reset freezestat shall stop fan, close outside air damper and open unit coil valve.

L. Air Handling Unit with Radiation (BELL M.S. ONLY)

1. Point List

a. Space Temperature
b. Discharge Temperature
c. Freezestat Status

d. Fan Start/Stop
e. Hot Water Valve Modulation
f. Radiation Valve Modulation

2. Sequence of Operation

c. Unoccupied Mode: The radiation valve (where applicable) shall modulate to maintain night setback setpoint. Should the radiation alone fail to maintain the setpoint, the unit fan shall be energized.

d. Occupied Mode: Unit fan shall run continuously, radiation (where applicable) and unit coil valve shall modulate open. Should room temperature continue to rise past setpoint, radiation (where applicable) and unit coil valves shall modulate closed. (Radiation valve shall lead). As room temperature decreases the reverse shall occur. A manual reset freezestat shall stop fan, close outside air damper and open unit coil valve.

3.8 TRAINING

A. The Contractor shall supply personnel to train key customer personnel in the operation and maintenance of the installed system. The training program shall be designed to provide a comprehensive understanding and basic level of competence with the system. It shall be sufficiently detailed to allow customer personnel to operate the system independent of any outside assistance. On-line context sensitive HELP screens shall be incorporated into the system to further facilitate training and operation.

B. The training plan shall include detailed session outlines and related reference materials. The customer personnel shall be able to utilize these materials in the subsequent training of their co-workers.

1. Training time shall not be less than a total of 40 hours, and shall consist of:

a. 16 hours during normal day shift periods for system operators. Specific schedules shall be established at the convenience of the customer.

b. 24 hours of system training shall be provided to customer supervisory personnel so that they are familiar with system operation.

c. The specified training schedule shall be coordinated with the customer and will follow the training outline submitted by the Contractor as part of the submittal process.

d. Provide an as built Video training tape, showing & explaining all animated graphics in detail, all controllers and equipment the FMS operates. (Four (4) Copies shall be supplied)

e. If further training is needed, the Contractor shall provide another 40 hours at no extra cost.

2. All training sessions shall be scheduled by the Construction Manager. The Contractor shall provide sign-in sheets and distribute minutes of each session prior to the subsequent session. This documentation shall be included in the Operation and Maintenance manuals.

END OF SECTION 230460

SECTION 230470 - TESTING, START-UP AND ADJUSTMENTS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 TESTING, START-UP AND ADJUSTMENTS

A. Furnish all materials, supplies, labor and power required for testing. Make preliminary tests and prove work satisfactory. Notify Architect and all authorities having jurisdiction in ample time to be present for final testing of all piping. Test before insulating or concealing any piping. Repair defects disclosed by tests, or if required by Architect, replace defective work with new work without additional cost to Owner. Make tests in stages if so ordered by Architect to facilitate work of others. Use of wicking in tightening leaking joints not permitted.

B. HVAC Contractor is responsible for work of other trades disturbed or damaged by tests and/or repair and replacement of his work, and shall cause work so disturbed or damaged to be restored to its original condition at his own expense.

C. Unless otherwise specified, all piping systems shall be hydrostatically tested to 150 p.s.i.g. Tests shall be of four (4) hour duration during which time piping shall show no leaks and during time no sealing of leaks will be permitted.

D. HVAC Contractor shall balance out system and submit test reports showing operating data to include the following:

1. C.F.M. of all air handling equipment.
2. C.F.M. at each air outlet.
3. G.P.M. for equipment.
4. R.P.M. for each fan and fan motor.
5. Motor power consumption.
6. Air temperature readings before and after coils.
7. Water temperature readings in and out of coils and through equipment.
8. Pressure gauge readings before and out of all pertinent equipment.

E. If the performance of the systems does not conform to the design parameters the Contractor shall return to the site until the systems perform as designed.

F. HVAC Contractor shall furnish services of qualified personnel, thoroughly familiar with job, to operate and make all adjustments so that system and control equipment shall operate as intended. This shall include adjustment/replacement of sheaves/impellers to achieve design performance. Adjustments shall be made including balancing of water and air systems in cooperation with qualified representatives of mechanical equipment manufacturers and temperature control manufacturer. This shall include any required adjustment/replacement of sheaves, belts, impellers, etc. to achieve design performance. Architect/Engineer is to be notified when this balancing is to be performed.

G. When all work is in an acceptable operating condition, furnish operating and maintenance manuals as specified in General Requirements.

H. All HVAC equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces.

I. Contractor shall include in his Bid, adjustment of air quantity below scheduled C.F.M. for air systems deemed “noisy” by Owner subsequent to initial balancing.

J. The Contractor shall be required to rectify of replace at his own expense, any equipment not complying with the foregoing requirements.

K. Final inspection and approval shall be made only after proper completion of all of above requirements.

END OF SECTION 230470

SECTION 230480 - GENERAL LABELING, VALVE CHARTS AND PIPING IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 GENERAL LABELING AND VALVE CHARTS

A. This Contractor shall have appropriate descriptive labels, identification tags and nameplates of equipment, valves, etc. furnished and installed under this Contract and shall be properly placed and permanently secured to (or adjacent to) the item being installed. All such labels, identifications, tags, nameplates, etc. shall be selected by the Architect/Engineer.

B. In general, labels shall be the lamacoid type of sufficient size to permit easy identification, black coated, white edged, with letters 3/16" high. Major equipment, apparatus, control panels, etc. shall have 8" x 4" lamacoid plates with lettering of appropriate size.

C. Provide tags for all valves, automatic and manual dampers. Tags shall be Type #2020 anodized aluminum of #1420 lamacoid engraved. Tags may not necessarily be standard. Fasten tags to valve or damper with brass chain.

D. All nameplates, labels, identifications and tags shall be as manufactured by the Seton Name Plate Co., of New Haven, CT or approved equal. Submit complete schedules, listings and descriptive data together with samples for checking and approval before purchasing. Labeling shall include the "number" of the equipment, valve, dampers, switch, etc. and service of the valve.

E. Mount on laminated plastic boards with transparent surface all valves, wiring diagrams, control diagrams, instruction charts, permits, etc. Valve chart shall be non-fading with original copies laminated.

1.2 IDENTIFICATION OF PIPING

A. This Contractor shall provide on all piping, semi-rigid, wrap around plastic identification markers equal to Seton Snap-Around and/or Seton Strap-On pipe markers.

B. Each marker background is to be appropriately color coded with a clearly printed legend to identify the contents of the pipe. Directions of flow arrows are to be included on each marker.

C. Identification of all piping shall be adjacent to each valve, at each pipe passage through wall, floor and ceiling construction and at each branch and riser take-off.

D. Identification shall be on all horizontal pipe runs, marked every 15 ft. as well as at each inlet outlet of equipment.

END OF SECTION 230480

SECTION 230485 - HVAC SYSTEMS COMMISSIONING

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 RELATED DOCUMENTS

A. Section 01 9100 – Commissioning Requirements, including drawings and general provisions of the Contract, including General and Supplementary Conditions, and other Division 01 Specification Sections.

B. In the case of a conflict between this and any other section in the project specifications, the more stringent or detailed requirements shall apply.

1.2 DEFINITIONS

A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

B. CxA: Commissioning Authority.

1.3 DESCRIPTION

A. The systems that shall be commissioned in this project include but are not limited to the following:

1. Central Building Automation System including packaged unitary controllers.

2. Equipment of the heating, ventilating and air conditioning systems.

1.4 OVERVIEW OF CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning inspections and tests at the direction of the CxA.

B. Attend construction phase controls coordination meeting.

C. Attend testing, adjusting, and balancing (TAB) review and coordination meetings.

D. Participate in HVAC systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Provide measuring instruments and logging devices to record test data and provide data acquisition equipment to record data for the complete range of testing for the required test period.

G. Provide detailed startup procedures.

H. Provide copies of all submittals, including all changes thereto, with details as required in the appropriate subsection of 3.1 Responsibilities.

I. Facilitate the coordination of the commissioning process and incorporate commissioning activities into overall project schedule (OPS).

J. Ensure all subcontractors and vendors execute their commissioning responsibilities according to the contract documents and the OPS.

K. Provide required demonstration and training of owner's personnel.

L. Review and accept construction checklists provided by commissioning authority (CxA).

M. Prepare O&M manuals, according to the contract documents, including clarifying and updating the original sequences of operation to as-built/as-tested conditions.

N. Cooperate with the CxA for resolution of issues recorded in the "Issues Log"

O. Prepare and provide all documentation as necessary for the compilation of the Systems Manual.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. The HVAC Contractor shall provide all standard testing equipment required to perform startup, initial checkout, and testing requirements of Division 23.

B. The Controls Contractor shall provide all standard testing equipment required to test the Building Automation and Automatic Temperature Control System (BAS), including calibration of valve and damper actuators and all sensors. Trend logs for functional testing shall be generated through the BAS interface as requested by the CxA.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the following tolerances. Temperature sensors and digital thermometers shall have a certified calibration, performed within the past year, to an accuracy of 0.5°F and a resolution of ± 0.1 °F. Pressure sensors shall have an accuracy of ± 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 RESPONSIBILITIES

A. HVAC, Controls and TAB Contractors. The commissioning responsibilities applicable to each of the HVAC, Controls and TAB Contractors of Division 23 are follows:

1. Attend the initial commissioning meeting conducted at the start of construction, the commissioning meeting held 30 days prior to startup of the primary equipment, and all commissioning team meetings.

2. Provide a copy of approved shop drawings and startup reports for all commissioned equipment to the CxA. Supplement the shop drawing data with the manufacturer's installation and start-up procedures. This material should be identical to the literature which will be included in the Operation and Maintenance Manuals.

3. The Operation and Maintenance Manuals shall be submitted to the CM prior to the start of training (three (3) weeks before startup and training and at least sixty (60) days before substantial completion).

4. Perform and document results of Pre-functional Inspections at the direction of the CxA. Ensure that the inspection checklists are completed before startup or as specified by the CxA.

5. During the startup and initial checkout process, execute all portions of the manufacturer's start-up checklists for all commissioned HVAC equipment.

6. Perform and clearly document all completed startup and system operational checkout procedures and provide a copy to the CxA.

7. Perform and document results of equipment functional testing at the direction of the CxA. Ensure that the testing is completed in the timeline specified by the CxA.

8. Address current A/E punch list items and Commissioning corrective action items on the "Issues Log" before functional testing. Air and water TAB shall be completed, with discrepancies and problems remedied, before functional testing of the respective air-or water-related systems.

9. Provide skilled technicians to execute starting of equipment and to perform tests in accordance with all Division 23 sections. Where specified, startup shall be performed by a factory authorized service representative. Ensure that they are available and present during the agreed-upon schedules for the sufficient duration to complete the necessary tests, adjustments and problem-solving.

10. Correct deficiencies (differences between specified and observed performance as interpreted by the CxA and A/E) and retest the equipment.

11. Provide training of Owner's operating staff as specified in Division 23 Sections. Use expert qualified personnel.

12. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

13. Correct deficiencies and make necessary adjustments to O&M manuals for applicable issues identified in any seasonal testing.

B. HVAC Contractor. The responsibilities of the HVAC Contractor, during construction and acceptance phases in addition to those listed in (A) are:

1. Provide startup for all HVAC equipment.

2. Prepare a preliminary schedule for Division 23 pipe and duct system testing, flushing and cleaning, equipment start-up and TAB start and completion for use by the PM and CxA. Update the schedule as appropriate.

3. Notify the PM and CxA when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment, and TAB will occur. Be proactive in seeing that commissioning processes are executed and that the CxA has the scheduling information needed to efficiently facilitate the commission process.

4. Calibrations: The HVAC Contractor is responsible to calibrate all factory-installed sensors and actuators. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated by the HVAC Contractor.

5. Supervise all commissioning activities executed by subcontractors, including the Controls Contractor.

6. List and clearly identify on the as-built duct and piping drawings the locations of all flow meters, fire and smoke dampers, duct detectors, temperature sensors, relative humidity sensors, CO2 sensors, static and differential pressure sensors (air, water and building pressure).

C. Controls Contractor - The commissioning responsibilities of the Controls Contractor, during construction and acceptance phases in addition to those listed in (A) are:

1. Sequences of Operation Submittals. The Controls Contractor's submittals of control drawings shall include complete detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications. The submitted sequences shall generally include the following, but can vary according to project needs:

   a. An overview narrative of the system (one or two paragraphs) generally describing its purpose, components and function.
   b. Logic diagrams detailing the flow of information for each control algorithm. These diagrams should include all inputs, outputs, and computations.
   c. All interactions and interlocks with other systems.
   d. Detailed delineation of control between any packaged controls and the building automation system, listing which points the only monitored at the BAS, and which points can be controlled by and adjusted at the BAS.
   e. Written sequences of control for packaged controlled equipment. (Equipment manufacturers' stock sequences may be included but will generally require additional narrative).
   f. Start-up sequences.
   g. Warm-up mode sequences.
   h. Normal operating mode sequences.
   i. Unoccupied mode sequences.
   j. Shutdown sequences.
   k. Capacity control sequences and equipment staging.
   l. Temperature and pressure control: setbacks, setups, resets, etc.
   m. Detailed sequences for all control strategies, e.g., economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
   n. Effects of power or equipment failure with all standby component functions.

o. Sequences for all alarms and emergency shut downs.
p. Seasonal operational differences and recommendations.
q. Initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.
r. Daily/weekly/monthly schedules, as appropriate, if known.
s. To facilitate referencing in testing procedures, all sequences shall be written in small statements, each with a number for reference. Where possible, the numbering sequence shall correspond with Section 23 0460 Automatic Temperature Controls.

2. Control Drawings Submittal:

a. The control drawings shall have a key to all abbreviations.
b. The control drawings shall contain graphic schematic depictions of the system and each component.
c. The schematics shall include the system and component layout of any equipment that the control system monitors, enables, or controls, even if the equipment is primarily controlled by packaged or integral controls.

d. Provide a full points list with at least the following included for each point:

1. Controlled system.
2. Point abbreviation
3. Point description
4. Display unit.
5. Control point or setpoint (Yes/No)
6. Input point (Yes/No)
7. Output point (Yes/No)

e. The controls contractor shall keep the A/E, CxA, HVAC and TAB Contractor informed, in a timely manner, of all changes to this list during programming and setup.

3. Submit a written checkout plan indicating in a step-by-step manner, the procedures that will be followed to test, checkout and adjust the control system prior to functional testing. At minimum, the checkout plan shall include for each type of equipment controlled by the building automation system:

a. System name.

b. List of devices.

c. Step-by-step procedures for testing each controller after installation, including:

1. Process of verifying proper hardware and wiring installation.
2. Process of downloading programs to local controllers and verifying that they are addressed correctly.
3. Process for performing and documenting point-to-point checkout for each digital and analog input and output.

4. Process of performing operational checks of each controlled component.
5. Plan and process for calibrating valve and damper actuators and all sensors.
6. A description of the expected field adjustments for transmitter, controllers and control actuators should control responses fall outside of expected values.

d. A copy of the log and field checkout sheets that will document the process. This log must include a place for initial and final read values during calibration of each point and clearly indicate when a sensor, controller or command has "passed" and is operating within the contract parameters.

e. A description of the instrumentation required for testing.

f. Indicate the portion of the controls checkout plan that should be completed prior to TAB using the controls system for TAB work. Coordinate with the CxA and TAB Contractor for this determination.

4. Point-to-Point Checkout: Include in the checkout plan a point-to-point checkout. Each control point tied to a central control system shall be verified to be commanding, reporting and controlling according to its intended purpose. For each output, commands shall be initiated and verified to be functioning by visually observing and documenting the status of the controlled device in the field (e.g. valve or damper actuator response, pump or fan status). For each input, the system or conditions shall be altered to initiate the input response being tested and the response in the control system observed and recorded (e.g. high duct static pressure alarm).

5. Calibrations: The Controls Contractor is responsible to calibrate all field installed sensors and actuators using test and documentation methods approved by the CxA. The HVAC Contractor is responsible to calibrate all factory installed sensors and actuators.

a. Sensors installed in the unit at the factory, with a calibration certification provided, need not be field calibrated by the HVAC Contractor.

b. Valve leak-by tests shall be conducted by the Contractor when shown on a construction checklist.

c. All procedures used shall be fully documented by the Controls Contractor on suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

6. Beyond the control points necessary to execute all documented control sequences, provide monitoring, control and virtual points as indicated in the Specifications.

7. Provide an official notice to proceed to the CxA and project team upon completion of the Building Automation System (BAS) and Automatic Temperature Control System (ATC) installation, including checkout and calibration of each controlled device, to confirm that all system programming is complete as to all respects of the Contract Documents. This shall be submitted by the Controls Contractor prior to the start of functional testing by the CxA.

D. TAB Contractor: The scope of work for the TAB Contractor is provided in Section 230460.

3.2 SUBMITTALS

A. The Contractor shall send one copy of product data, shop drawings and similar submittals to the CxA at the same time they are submitted to the A/E. The CxA will review the submittals and provide any comments to the A/E for inclusion in their comments. The Architect will transmit to the CxA, for the CxA's use in preparing functional test procedures; one reviewed and approved copy of product data, shop drawings and similar submittals received from the HVAC, Controls and TAB Contractors, pertinent to equipment and systems to be commissioned.

3.3 STARTUP

A. The HVAC, Controls and TAB Contractors shall follow the start-up and initial checkout procedures listed in the Responsibilities list in this section. Equipment start-up is required to complete systems and sub-systems so they are fully functional, in compliance with the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility, or partially shift that responsibility to any extent onto the Commissioning Agent or Owner.

B. Testing is intended to begin upon completion of a system. Refer to Section 019100 for additional information related to scheduling.

3.4 TESTS

A. The HVAC and Controls Contractors shall provide the necessary support to the CxA to complete functional testing. The Controls Contractor shall fully test and verify all aspects of the BAS Contract Work on a point / system / integrated operational basis for all points, features and functions specified. The following requirements apply to all mechanical and control systems and features that are to be commissioned when referenced below. Tests shall:

1. Verify functionality and compliance with the basis of design for each individual sequence module in the sequence of operations. Verify proper operation of all control strategies, energy efficiency and self-diagnostics features by stepping through each sequence and documenting equipment and system performance. Tests shall include startup, normal operation, shutdown, scheduled 'on' and 'off', unoccupied and manual modes, safeties, alarms, over-rides, lockouts and power failure.

2. Verify operation of systems and components that may be impacted during low, normal and high load conditions and during combinations of environmental and interacting equipment conditions that could reasonably exist and potentially result in adverse system reaction.

3. Verify all alarm and high and low limit functions and messages generated on all points with alarm settings.

4. Verify integrated performance of all components and control system components, including all interlocks and interactions with other equipment and systems.

5. Verify shutdown and restart capabilities for both scheduled and unscheduled events (e.g. power failure recovery and normal scheduled start/stop).

6. Verify proper sequencing of heat transfer elements as required to prevent simultaneous heating and cooling, unless specifically required for dehumidification operation.

7. Verify system response and stability of control loops under different load conditions and determine if additional loop tuning is required for dehumidification operation.

8. When applicable, demonstrate a full cycle from 'off' to 'on' and 'no load' to 'full load' and then to 'no load' and 'off'.

9. Verify time of day schedules and setpoints.

10. Verify all energy saving control strategies.

11. Verify that all control system graphics are complete, that graphics are representative of the systems, and that all points and control elements are shown in the same location on the graphics as they are located in the field.

12. Verify operation control of all adjustable system control points, including proper access level as agreed to during the controls system demonstration.

B. In addition to specific details, and/or standards referenced for acceptance testing indicated in other Division 23 sections, the following common acceptance criteria shall apply to all mechanical equipment, assemblies, and features:

1. For the conditions, sequences and modes tested, the equipment, integral components and related equipment shall respond to varying loads and changing conditions and parameters appropriately as expected, according to the sequence of operation, as specified, according to acceptable operating practice and the manufacturer's performance specifications.

2. Systems shall accomplish their intended function and performance (e.g. provide supply air and water at designated temperature and flow rate, etc., and maintain space conditions in terms of air temperature, relative humidity, and CO2 concentration) at specified levels at varying conditions.

3. Control loops shall be stable under all operating conditions. Control loops shall exhibit a quarter decay ratio type response to a step change or other upset and return to stable operation in a time frame that is reasonable and realistic for the system that they are associated with.

4. Resetting a manual safety shall result in a stable, safe, and predictable return to normal operation by the system.

5. Safety circuits and permissive control circuits shall function in all possible combinations of selector switch positions (hand, auto, inverter, bypass etc.).

6. Additional acceptance criteria may be defined by the CxA when detailed tested procedures are developed.

7. At the CxA's discretion, if large numbers of deficiencies or repeated deficiencies are encountered, the CxA shall suspend functional testing until the Contractor corrects the deficiencies and troubleshoots all remaining systems at issue on their own. The Contractor shall be responsible for any resulting schedule delays that increase the overall time period to complete functional testing.

8. Retesting: The CxA will direct the retesting of the equipment once at no charge to the Owner for their time. The CxA's time and expenses incurred for a second retest, if required due to no fault of the CxA, will be reviewed by the Owner to determine the appropriate means of compensation to the CxA for extension of services. The functional testing shall include operating the system and components through each of the written sequences of operation, and other significant modes and sequences, including startup, shutdown, unoccupied mode, manual mode, staging, miscellaneous alarms, power failure, security alarm when impacted and interlocks with other systems or equipment. Sensors and actuators shall be calibrated during construction checkout by the installing contractors and spot-checked by the CxA during functional testing.

3.5 WRITTEN WORK PRODUCTS

A. Written work products of Contractors shall consist of the filled out start-up, initial checkout, and test documentation in accordance with all Division 23 sections.

END OF SECTION 230485

SECTION 230490 GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GUARANTEE

A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with the guarantee provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace, and/or repair any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION 230490

SECTION 260100 - GENERAL CONDITIONS

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 DESCRIPTION OF WORK

A. It is the intention of the Specification and Drawings to call for finish work, tested and ready for operation.

B. Any apparatus, appliance material or work not shown on the Drawings but mentioned in the Specifications, or vice versa, or any incidental accessories or ancillary devices necessary to make ready for operation even if not particularly specified, shall be furnished, delivered and installed under their respective Division without additional expense to the Owner.

C. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the work as though they were hereinafter specified or shown.

D. Work under each section shall include giving written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules and regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that work under each section has included the cost of all necessary items for the approved satisfactory functioning of the entire system without extra compensation.

E. Small scale drilling through walls and floors which may contain asbestos shall be performed by a person with a “restricted asbestos handler allied trades certificate” and shall have a copy of it in his possession at all times while working of the project.

1.2 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of the system and work included in the Contract. (Do not scale the drawings). Consult the Architectural Drawings and details for exact location of fixtures and equipment; where same are not definitely located, obtain this information from the general construction supervisor.

B. Work under each section shall closely follow Drawings in layout of work; check Drawings of other Divisions to verify spaces in which work will be installed. Maintain maximum headroom; do not begin work until unsatisfactory conditions are corrected.

C. Make reasonable modifications in the layout as needed to prevent conflict with work of other Sections of the Specifications or for proper execution of the work.

D. It shall be understood that the right is reserved by the Architect/Engineer to change the location of equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.

1.3 SURVEYS AND MEASUREMENTS

A. Base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.

B. Before proceeding with the work resolve discrepancies between actual measurements and those indicated, which prevent following good practice or intent of the Drawings or Specifications.

1.4 CODES AND STANDARDS – Coordinate with Division 1

A. The Codes and Standards listed below apply to all Electrical work codes or standards that are mentioned in these Specifications; the latest edition or revision shall be followed:

1. NEMA - Standards
2. ANSI CI - National Electrical Code (NFPA 70)
3. ANSI C50.13 - Rotating Electrical Machinery
4. NEMA MG2 - Construction and guide for selection, installation and use of electric motors.
5. NEMA MG1 - Motors and Generators

B. The following State and Local Codes shall apply: New York State Uniform Fire Prevention and Building Code, and Local Building Codes.

C. The following abbreviations are used within this Division of the Specifications:

1. IES - Illuminating Engineering Society.
2. NEC - National Electrical Code
3. ANSI - American National Standards Institute
4. ASTM - American Society for testing and materials
5. EPA - Environmental Protection Agency
6. IEEE - Institute of Electrical and Electronic Engineers
7. NEMA - National Electrical Manufacturers Association
8. NFPA - National Fire Protection Association.
9. OSHA - Occupational Safety and Health Administration
10. UL - Underwriter's Laboratories

1.5 PERMITS AND FEES

A. Give all necessary notices, obtain all permits and pay all Government and State sales taxes and fees where applicable, and other costs, including utility connections or extensions in connection with work of this Division. File all necessary plans, prepare all documents and obtain all necessary approvals of all Governmental and State departments having jurisdiction; obtain all necessary certificates of inspections for his work and deliver a copy to the Architect before request for acceptance and final payment for the work. Pay fees for utility construction/connections.

B. Include in the work, without extra cost to the Owner, any labor, materials, services, and apparatus, Drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on the Drawings and/or specified.

C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with the requirements of the local utility companies, with the recommendations of fire insurance rating organization having jurisdiction and with the requirements of all governmental departments having jurisdiction.

D. All materials and equipment for the electrical portion of the mechanical systems shall bear the approval label of or shall be listed by the Underwriter's Laboratories, Inc.

1.6 TEMPORARY LIGHT AND POWER – See Division 1

A. The Contractor shall furnish, install, maintain and, upon direction to do so, remove system of temporary lighting and power for the use of all construction trades.

B. The Electrical Contractor shall provide adequate electrical service for the needs of all Contracting Trades.

C. Wiring shall be provided for temporary use during building construction, including grounding and fused main cut-off switches. Temporary electric lines with branch switches shall be provided for lighting and for taps for electric tools, pumps and other temporary equipment; all connected to a main line looped through floor spaces and up stair wells or shafts. All power outlets shall be grounded to an equipment ground wire in an approved manner. Electric lines shall be extended to power tools, which cannot be located within reach of extension cords.

D. Light bulbs shall be provided in sufficient quantity to light the building for safety purposes. Extension cords shall be provided as may be essential to the proper execution of the work. Temporary lighting shall be provided for all stairs and other locations where needed for safety or the proper execution of the work.

E. The Electrical Contractor shall maintain temporary lighting and power systems in good working condition, including the relocation and reinstallation when required to avoid interference with the progress of construction.

F. Provide ground-fault personnel ampere protection for all single phase, 15 and 20 ampere receptacles. All receptacles and portable cord connectors shall have NEMA standard locking type configurations.

G. The Electrical Contractor shall turn lights on and off at the beginning and end of each working day of any trade unless otherwise directed. He shall arrange for all temporary light and power for all trades which do not have holidays (days off) similar to the electrical trade. The Electrical Contractor shall patch and repair all openings left damaged by the installation and removal of the temporary light and power.

1.7 MANUFACTURER'S IDENTIFICATION

A. Manufacturer's nameplate, name or trademark and address shall be attached permanently to all equipment and materials furnished under this Division. The nameplate of a contractor or distributor may not be used.

1.8 SHOP DRAWINGS – See Division 1

A. Submit for approval detailed shop drawings of all equipment and materials in accordance with working procedures.

B. Furnish all necessary templates and patterns for installation work and for the purpose of making adjoining work conform; furnish setting plans and shop details to other trades as necessary.

C. Submit shop drawings for the following:

1. Light fixtures.
2. Receptacles, switches, occupancy sensors.
3. Overcurrent protective devices.
4. Panelboards.
5. Clocks and P.A. system components.
6. Fire alarm system.

1.9 MATERIALS AND WORKMANSHIP

A. All materials and apparatus necessary for the work, except as specifically indicated otherwise, shall be new, of first class quality and shall be furnished, delivered, erected, connected and finished in every detail and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first class standard article as accepted by the Architect shall be furnished.

B. Furnish the services of an experienced Superintendent who shall be constantly in charge of the installation of the work, together with all skilled workmen, helpers, and labor to unload, transfer, erect, connect up, adjust, start, operate and test each system.

C. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.10 PROTECTION

A. Work under each Section shall include protecting the work and materials of all other Sections from damage from work or workmen, and shall include making good all damage thus caused. Be responsible for work and equipment until finally inspected, tested, and accepted; protect work against theft, injury or damage; and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing or other foreign material.

B. Work under each section includes receiving, unloading, uncrating, storing, protecting, setting in place and connecting up completely of any equipment supplied under each section. Work under each section shall also include exercising special care in handling and protecting equipment and fixtures, and shall include the cost of replacing any of the above equipment and fixtures which are missing or damaged by reason of mishandling of failure to protect on the part of the Contractor.

1.11 BASES AND SUPPORTS

A. Unless specifically noted otherwise, provide all necessary supports, pads, bases, and piers required for all equipment under this Division. Provide all temporary bases and supports as required.

B. All equipment, unless shown otherwise, shall be securely attached to the building structure. Attachments shall be of a strong and durable nature; any attachments that are, insufficient, shall be replaced as directed by the Architect.

1.12 SLEEVES, INSERTS AND ANCHOR BOLTS

A. All conduits passing through floors, walls or partitions shall be provided with sleeves having an internal diameter one inch larger than the outside diameter of the conduit, or insulation enclosing the conduit.

B. Furnish all sleeves, inserts, and anchor bolts necessary to be installed under other sections of the Specifications to accommodate work of this section.

C. Sleeves through outside walls shall be cast iron sleeves with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The remaining space shall be packed with oakum to within 2 inches of each face of the wall. The remaining shall be packed and made watertight with a waterproof compound.

D. Sleeves through concrete floors or interior masonry walls shall be schedule 40 black steel pipe, set flush with finished walls or ceiling surfaces but extending 2 inches above finished floors.

E. Sleeves through interior partitions shall be 22 gauge galvanized sheet steel, set flush with finished surfaces or partitions.

F. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4” inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods up to 1/2” diameter to be passed through the insert body. Strip inserts shall have attached rods having hooked ends to allow fastening to reinforcing rods. Inserts shall be as manufactured by Carpenter and Patterson, Inc. or Grinnell Co., Inc.

G. Penetrations through fire-rated walls, ceilings and floors in which cables, conduits pass, shall be sealed by a UL approved fire stop fitting classified for an hourly rating equal to the fire rating of the floor, wall or ceiling shall be Gedney Fire Seal Type CFSF of CAPS.

1.13 PAINTING – See Division 1; all work required shall be performed by this Contractor.

A. All finish painting in finished areas shall be performed by others.

B. All materials shipped to the job site under the Division, such as panels and plates, shall have a prime coat and standard manufacturer's finish unless otherwise specified.

C. Inaccessible conduits, hangers, supports and anchors and ducts shall be coated prior to installing.

D. All components of the fire alarm system raceway shall be painted red. This includes but is not limited to conduit, junction boxes, pull boxes.

1.14 CUTTING AND PATCHING – See Division 1

A. All cutting and patching required for the work of this Division shall be done by this Division.

B. Work under this Division shall include furnishing, locating and setting inserts and/or sleeves. Do all drilling and cutting necessary for the installation.

C. All holes cut through concrete slabs and structural steel shall be punched or drilled from the underside. No structural member shall be cut without the written acceptance of the Architect and all such cutting shall be done in a manner directed by him.

D. Refer to Division 1 for additional requirements.

1.15 SCAFFOLDING, RIGGING AND HOISTING – Coordinate with Division 1

A. Furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished under this Division. Remove same from premises when no longer needed.

1.16 EXCAVATING AND BACKFILLING

A. All excavation and backfilling for the work of this Division shall be performed by Division 2.

1.17 WATERPROOFING

A. Where any work penetrates waterproofing, including waterproof concrete and floors in wet areas. Submit proposed method of installation for review by the Architect before beginning work. Furnish all necessary sleeves, caulking and flashing necessary to make opening absolutely watertight.

1.18 ACCESSIBILITY AND ACCESS PANELS

A. Be responsible for the sufficiency of the size of shafts and chases, the adequate thickness of partitions, and the adequate clearance in double partitions and hung ceilings for the proper installation of the work of this Division.

B. Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Minor deviations from Drawings may be allowed for better accessibility with approval of the Architect.

1.19 SHUTDOWNS – See Division 1

A. When installation of a new system necessitates the temporary shutdown of an existing utility operating system the connection of the new system shall be performed at such time as designated by and in consultation with the Utility Company. Work required after normal business hours shall be done so at no additional cost to the Owner.

1.20 CLEANING - Coordinate with Division 1

A. Thoroughly clean all equipment of all foreign substances inside and out before being placed in operation.

B. If any foreign matter should stop any part of a system after being placed in operation, the system shall be disconnected, cleaned and reconnected whenever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.

C. Upon completion of work remove from the premises all rubbish, debris, and excess materials. Any oil or grease stains on floor areas caused by work of this Division shall be removed and floor areas left clean.

1.21 RECORD DRAWINGS – Work shall be governed by requirements set forth in Division 1

A. Maintain at the job site a record set of Electrical Drawings on which any changes in location of equipment, panels, devices, and major conduits shall be recorded. Indicate dimensions of all items installed underground or in concrete.

1.22 OPERATING INSTRUCTIONS – Coordinate with requirements set forth in Division 1

A. Upon completion of all work and all tests, the Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period specified under each applicable Section of this Division. During this period, he shall instruct the Owner or his representative fully in the operation, adjustment and maintenance of all equipment furnished. Give at least 7 days notice to the Owner in advance of this period.

B. The manufacturer shall attest in writing that his equipment has been properly installed prior to start. The following is some of the equipment necessary for this inspection: fire alarm system. These letters will be bound into the operating and maintenance books.

1.23 ADJUSTING AND TESTING

A. After all equipment and accessories to be furnished are in place, they shall be put in final adjustment and subjected to such operating tests as will assure the Architect that they are in proper adjustment and in satisfactory permanent operating condition.

B. This particular work shall include the services of a factory engineer to inspect the installation and assist in the initial startup and adjustment to the equipment. The period of these services shall be for such time as necessary to secure proper installation and adjustments. After the equipment is placed in permanent operation, there shall be furnished the service of said engineer for the purpose of supervising the initial operation of the equipment and to instruct the personnel responsible for operation and maintenance of the equipment.

C. At the completion of the job when all panels, devices, etc. are at full working load the Contractor shall provide infrared scan thermographic inspection test of all connection points, terminals, etc. of wires #8 AWG and larger to detect "hot-spots" in the electrical current flow. Correct all hot-spots.

1.24 UNDERWRITER'S LABEL

A. All electrical equipment and materials shall be new and shall comply with the standards of and shall bear the label of the Underwriter's Laboratories.

1.25 ELECTRICAL SAFETY INSPECTION

A. Electrical Contractor shall arrange for an Electrical Safety Inspection to be performed by the Local Inspection Agency (i.e.: New York Electrical Inspection Services, Atlantic Inland, Middle Department Inspection Agency). A Certificate of Compliance “Underwriter’s Certificate” shall be issued to the Owner. All costs and coordination required shall be included in this Contractors Base Bid.

1.26 REMOVALS – Coordinate with Division 1 and Division 2

A. The scope of removals shown on the Drawings are diagrammatic only and indicate the intent of the work to be performed and not the complete scope of demolition and/or removal work. It shall be the responsibility of this Contractor to remove any electrical devices even if not specifically indicated to be removed on these Drawings in order to accommodate new work.

B. All power conductors, control wiring and conduit associated with mechanical equipment such as fans, pumps, etc. designated for removal on the HVAC Drawings shall be removed clear back to the source of power and disconnected. All motor starters, disconnect switches, control devices, etc. shall be removed. Refer to HVAC Drawings for extent of HVAC removals.

C. Any device removed shall include (but shall not be limited to) the removal of all associated wiring, conduit, boxes, and auxiliary devices back to the previous device on the circuit, or back to the panelboard or origin of the circuit or any other items that are not incorporated in new layout, until such removal is complete. If the removal of any device interrupts service of any other device that is to remain, the Contractor shall provide all materials and labor to ensure continuity of service to those devices to remain.

D. Junction boxes, pullboxes, wireways, conduits, or any other devices required to reconnect circuitry shall be installed concealed within the ceilings, partitions and/or walls, floors, no surface or exposed circuiting shall be permitted, unless specifically indicated.

E. The Electrical Contractor shall patch all openings in walls, ceilings or roof that are left open as a result of removals. Refer to cutting and patching section.

F. Any electrical device removed including but not limited to disconnect switches, panelboards, etc. shall be cleaned, protected and turned over to the Owner or disposed of as directed by Owner.

END OF SECTION 260100

SECTION 260125 - SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SCOPE OF WORK

A. The work under this section includes all labor, materials, equipment, tools, transportation and the performance of all work necessary and required for furnishing and installing all Electrical work shown on the Contract Documents, as specified herein and as otherwise required by job conditions or reasonably implied, including, but not necessarily limited to the following:

1. The addition of new fire alarm devices (i.e., automatic fan shutdown, for new HVAC equipment) as shown on Drawings.

2. The contractor shall dispose of all debris, including but not limited to fixtures, equipment, lamps, ballast, wiring devices and the like in accordance with, as defined by governing law and regulations of the jurisdiction where the work is being performed.

3. Modifications to existing electrical distribution system as indicated on the Drawings.

4. Distribution panelboard, circuit breaker panelboards, secondary transformers, feeder, conduit, cables and branch circuit wiring with all connections complete.

5. Conduit, conduit fittings, junction and pull boxes and all appurtenances necessary for the raceway systems including necessary supports and fasteners.

6. Electrical conductors, connectors, fittings and connection lugs.

7. Branch circuit devices, outlet boxes, pull boxes, motor disconnect switches, etc.

8. Power wiring to HVAC equipment including disconnect switches as shown and/or required by NEC.

9. Core drilled holes for conduit passing through walls, ceilings and floors.

10. All necessary cutting, patching and core drilling incidental to the electrical work.

11. Licenses, permits, inspection and approvals.

12. Grounding as required as per NEC.

13. Sleeves for conduit and watertight caulking between conduit and sleeve.

14. Testing.

15. Cutting, patching and drilling.

B. Coordination Drawings (if applicable): Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of any and all claims for either or both “time” and “money”.

1.2 WORK NOT INCLUDED

A. The following related items will be done by others:

1. Furnishing motors and controllers.

2. Concrete work.

3. Excavation and backfill.

END OF SECTION 260125

SECTION 260150 - APPROVED MANUFACTURERS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 APPROVED MANUFACTURERS

A. The following list of manufacturers constitutes an approved list:

1.	Panelboards	Siemens, Square D, GE
2.	Disconnect Switches	Siemens, Square D, GE
3.	Conduit (steel)	Wheatland, Allied, Republic Conduit
4.	Conduit Fittings (steel)	Appleton, Crouse-Hind, O-Z, T&B, M&W
5.	Wire and Cable	General, South Wire, Rome, Cerro
6.	Splicing Connectors	3M, O-Z, Thomas & Betts
7.	Outlet Boxes	Appleton, National, Steel City, Raco
8.	Wiring Devices	Arrow-Hart, Hubbell, P & S
9.	Fuses	Bussman, Ferraz-Shawmut, Littlefuse
10.	Lamp	GE, Sylvannia, Philips
11.	Fire Alarm System	Match Existing

B. All materials and appliances shall have listing of Underwriters Laboratories, Inc. and be so labeled, or shall conform to their requirements, in which case certified statements to that effect shall be furnished by the manufacturer with a copy of an examination report by a recognized independent testing laboratory acceptable to the Architect and his Engineer. Use new materials and appliances throughout.

C. Where several types or makes of materials are specified, the Contractor has the option of using any of these, but after a type or make has been selected and has received the approval of the Architect, it shall be used throughout.

D. The Contractor shall provide all structural supports for the proper attachment of equipment supplied by him and also for all equipment supplied to him under other sections of the Specifications for mounting and connections.

E. Secure all equipment to the building structure independently. Do not secure to work of other trades such as ceiling lath, piping racks, etc., unless specified or noted otherwise.

F. Wall mounted equipment shall be directly secured to wall by means of steel bolts. Maintain at least 1/4" air space between equipment and supporting wall. Pre-fabricated steel channels providing a high degree of mounting flexibility, such as those manufactured by Kindorf and Unistrut, shall be used for mounting arrays of equipment.

G. All fastening, supports, hangers, anchors, etc., shall be of a type made for the specific purpose. On masonry walls, metallic expansion shield and machine screws shall be used. Screws with wooden plugs or anchors will not be acceptable on any part of the work.

END OF SECTION 260150

SECTION 260200 - CONDUIT

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install rigid metal conduit, electrical metallic tubing and liquid tight flexible metal conduit, including all fittings to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Cutting and patching.

B. Trenching: Excavation and backfill for conduit and utility on site.

C. Sheet metal flashing and trim.

1.3 REFERENCE FOR METAL RACEWAY

A. UL 5 - Surface Metal Raceways and Fittings.

B. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings.

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT

A. Industry standard heavy wall conduit.

B. Minimum 3/4" trade size.

C. Threaded.

D. Hot dipped galvanized finish by means of plating after cutting of threads.

2.2 INTERMEDIATE METAL CONDUIT

A. Industry standard steel conduit.

B. Minimum 3/4" trade size.

C. Threaded.

D. Hot dipped galvanized finish by means of plating after cutting of threads.

2.3 ELECTRICAL METALLIC TUBING

A. Industry standard thin wall conduit of galvanized steel only.

B. Minimum 3/4" trade size.

C. Maximum 4" trade size.

2.4 FLEXIBLE METAL CONDUIT

A. Galvanized steel tape formed into an industry standard interlocking coil.

B. Minimum 3/4" trade size except for connection of lighting fixtures.

C. Grounding type.

D. Separate ground conductor.

E. Use for short connections to motor terminal box, other vibrating equipment using a minimum length of 18" with 50% slack and a maximum of 6'.

F. From outlet box to recessed lighting fixtures with a maximum length of 6'.

2.5 WIREWAYS

A. Lay-in type, UL listed as wireway or auxiliary gutter.

B. Wireway shall be of code gauge steel construction (UL standard for Wireway Auxiliary Gutters and Associated Fittings) with removable cover. Tamperproof screws shall be provided for sealing covers to prevent access by unauthorized personnel. Wireway shall be provided with knockouts.

C. Connector and covers shall be attached so that removal of connectors is not necessary to utilize the lay-in feature.

D. Finish: All sheet metal parts shall be provided with a rust inhibiting phosphating coating and baked enamel finish. All hardware shall be plated to prevent corrosion. All screws extending into the wireway shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

2.6 CONDUIT SUPPORTS

A. Conduit clamps, straps and supports: Steel or malleable iron.

2.7 CONDUIT FITTINGS

A. Use compression fittings for all EMT in exposed areas. Utilize set screw fittings only above hung ceilings and concealed areas.

2.8 SURFACE METAL RACEWAY

A. Metal raceway shall be of a two-piece design with a base and snap-on cover.

B. Raceway and all components shall be listed by Underwriters Laboratories

C. Single Channel: Steel, zinc plated, off-white finish suitable for repainting. Two piece design with metal base and snap-on cover. Wire Mold V700, Hubbell Inc. 750 Series, or Panduit PMR5/PMR7

D. Dual Channel: Steel, galvanized, off-white finish but suitable for repainting. Two-piece design with metal base and snap-on cover, minimum 0.04" thick base and cover. Base shall be divided by a removable barrier section. Provide duplex receptacles mounted in top cell and communication outlets in the bottom cell. Coordinate communications jack requirements with owner's IT personnel. Wiremold V4000, Wiremold DS4000 Series, Hubbell Inc. 4000 Series or Panduit PMR40.

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT AND SUPPORT

A. Minimum size - 3/4". Provide grounding bushings on all conduits 1-1/4" and larger.

B. Arrange conduit to maintain headroom and present a neat appearance.

C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.

D. Draw up couplings and fittings full and tight. Protect threads cut in field from corrosion. Paint newly threaded joints of steel conduit with T & B "Kopershield" compound before installation. Running threads prohibited; use three-piece unions or split couplings instead. Use only compression fittings for all EMT in areas where it will be exposed in finished and unfinished areas. Provide set screw fittings only when installed above hung ceilings.

E. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues; steam pipes and heating appliances.

F. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

G. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

H. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

I. Exposed conduit on ceiling shall be parallel or perpendicular to wall and vice versa to ceiling when installed on wall. Secure conduit clamps and supports to masonry materials by toggle bolt, expansion bolt or steel insert. Spacing or conduit supports shall not exceed 7 feet.

3.2 CONDUIT INSTALLATION

A. Cut conduit square using a saw or pipe cutter, Deburr cut ends.

B. Bring conduit to the shoulder of fittings and couplings and fasten securely.

C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes and for fastening conduit to sheet metal boxes in damp or wet locations.

D. Install no more than the equivalent of three 90-degree bends between boxes.

E. Use conduit bodies to make sharp changes in direction, as around beams.

F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch size.

G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

I. Provide No. 12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.

J. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.

K. Where conduit penetrates fire-rated walls and floors, provide pipe sleeves two sizes larger than conduit; Pack void around conduit with fire-stop fittings with UL listed fire rating equal to wall or floor ratings; Seal opening around conduit with UL listed foamed silicone elastomer compound.

L. Installation of conduit in slab shall comply with ACI 318.

M. Route conduit through roof openings for piping and duct work where possible; otherwise, route through roof with pitch pocket.

N. Maximum size conduit in slabs above grade: 1 inch. Do not route conduits to cross each other in slabs above grade. Conduits crossing each other may not be larger than 3/4 inch.

O. All conduit used for fire alarm system shall be painted red.

P. For Surface Metal Raceway

1. When installing surface metal raceway contractor shall provide boxes from the same manufacturer of the surface metal raceway.

2. Install separate grounding conductor. Grounding conductors for surface metal raceways.

3. Surface metallic raceways in close proximity of other trades, shall be arranged to allow for proper clearance for servicing and headroom. Surface metallic raceway shall be installed parallel to walls, floors and ceilings in a neat workmanlike manner.

3.3 CONDUIT INSTALLATION OF SCHEDULE

A. Underground installations: PVC minimum Schedule 40, unless otherwise noted on Drawings.

B. Installations in or under concrete slab: PVC minimum Schedule 40, unless otherwise noted on Drawings.

C. Exposed outdoor locations: Rigid galvanized steel conduit.

D. Wet interior locations: Rigid galvanized steel conduit.

E. Concealed dry interior locations and above accessible ceiling for receptacle and lighting branch wiring: Electrical metallic tubing up to first junction box and flexible metallic tubing (MC cable only) thereafter.

F. Concealed dry interior locations other than receptacle and lighting branch wiring: Electrical metallic tubing.

G. Concealed dry interior locations and above accessible ceiling for fire alarm runs: Fire alarm armored cable type MC with red stripe as manufactured by AFC series 1800.

H. Concealed and exposed dry interior location for feeder runs: Electric metallic tubing.

I. Exposed dry interior in unfinished locations other than Boiler Rooms: Electric metallic tubing.

J. Final connections to motors: Flexible metallic tubing (MC cable). Minimum of 10” to maximum of 6’ for connections to motors.

K. Existing exposed dry interior locations (finished spaces), for branch wiring and fire alarm wiring, one-piece steel raceway (similar to Wiremold V-500, V-700).

L. Final connections to motors: Flexible metallic tubing (MC cable). Minimum of 18” to maximum of 6’ for connections to motors.

M. All conduit installed in boiler room up to 10’-0” AFF and lower shall be rigid galvanized steel conduit. All conduit above 10’-0” shall be electric metallic tubing.

N. Final connections to equipment and/or motors in boiler room, outdoors and potentially wet indoor areas: liquid tight, flexible; minimum of 18” to maximum 6’-0” connections.

END OF SECTION 260200

SECTION 260300 - WIRE AND CABLE

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to wire and cable in raceway specified in other sections to complete all work shown on the Drawings or specified herein.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Thermoplastic-insulated building wire: Type THHN.

B. Rubber insulated building wire: NEMA WC 3.

C. Feeders and branch circuits larger than number 6 AWG: Copper, stranded conductor, 600 volt insulation, type THHN.

D. Feeder and branch circuits 6 AWG and smaller: Copper conductor, 600 volt insulation, THWN/THHN, 6 and 8 AWG, stranded conductor; Smaller than 8 AWG, solid conductor.

E. Service feeders and branch circuits in conduit in contact with earth shall be type XHHW.

F. Control circuits: Copper, stranded conductor 600 volt insulation, THHN.

2.2 ARMORED CABLE

A. BX or pre-manufactured cables are not acceptable except for Type MC for branch wiring after the first junction box (for receptacle and lighting branch circuits) and final connections to motors in interior dry accessible locations, minimum length shall be 18” with a maximum length of 6’ for motors. Except for outdoor and boiler room equipment and/or motors. Provide flexible liquid tight conduit.

B. Type MC fire alarm cable with red stripe for concealed fire alarm wiring as manufactured by AFC series 1800.

C. Armored cable, Type MC size 14 through 6 AWG: Copper conductor, 600 volt thermoplastic insulation, rated 90 degrees C., with separate green ground conductor.

2.3 REMOTE CONTROL AND SIGNAL CABLE

A. Control cable for class 2 or class 3 remote control and signal circuits:

1. Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together shielded and covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts and plenums. Verify wiring type with manufacturer.

2.4 COLOR CODING

A. All wiring shall be color-coded. Neutral wire shall be white throughout and each phase wire shall be identified any place in the system by its color code. All conductors in panel boxes and junction boxes shall be properly tagged with red non-flammable tags properly attached.

B. Wire shall be color coded as follows:

120/208 volt system		480/277 volt system		Fire Alarm
A Phase	Black	A Phase	Brown	Red
B Phase	Red	B Phase	Orange	
C Phase	Blue	C Phase	Yellow	

C. Equipment ground wires or ground jumpers shall be Green.

D. In addition to the basic color-coding described the following additional identification and tagging shall apply.

1. The switch legs for the local wall switches and in switch panel shall have distinctive stripes. In instances where color-coding is not practicable, such as short runs of heavy feeder cables, taping the ends of the cable with coded colors as indicated above or tagging will be permitted.

2. Cables shall be tagged in all pull boxes, wireways and wiring gutters of panels.

3. Where two (2) or more circuits run to or through a control device, outlet box or junction box, each circuit shall be tagged as a guide in making connections.

4. Tags shall identify wire or cable by number and/or piece of equipment served as shown on the Drawings.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.

B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet and for 20 ampere.

C. Use 10 AWG conductor for 20 ampere, 277 volt branch circuit home runs longer than 200 feet for 20 ampere.

D. Place an equal number of conductors for each phase of a circuit in same raceway or cable. No more than one of each phase shall be supported by a single neutral.

E. Splice only in junction or outlet boxes.

F. Neatly tag, identify, train and lace wiring inside boxes, equipment and panelboards.

G. Make conductor lengths for parallel circuits equal.

3.2 WIRING INSTALLATION IN RACEWAYS

A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricate for pulling 4 AWG and larger wires.

B. Completely and thoroughly swab raceway system before installing conductors.

C. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

3.3 CABLE INSTALLATION

A. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or metal cable ties to support cables from structure (not ceiling suspension system). Include bridle rings or drive rings.

B. Use suitable cable fitting and connectors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

A. Splice only in accessible junction boxes.

B. Use solderless pressure connections with insulating covers for copper wire splices and tape, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps.

C. Provide extended gutters and tap blocks or pull boxes with tap rail systems similar to Burndy MT Series or Burndy Electrorail system for wire splices 6 AWG and larger.

D. Tape uninsulated conductors with electrical tape to 150 percent of the insulation value of conductor.

E. Thoroughly clean wires before installing lugs and connectors.

F. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

G. Terminate spare conductors with electrical tape.

3.5 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of the Specifications.

B. Inspect wire and cable for physical damage and proper connection.

C. Torque test conductor connections and terminations to manufacturer's recommended values.

D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

3.6 WIRE AND CABLE INSTALLATION SCHEDULE

A. All wiring and cable shall be installed in conduit unless otherwise noted. Refer to conduit section 260200 for conduit types at various locations.

END OF SECTION 260300

SECTION 260320 - OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. Work of this section includes all labor, materials, equipment and services necessary to complete the electrical work as shown of the Drawings and specified herein, including, but not limited to, the following:

B. Fuses

1. Current limiting cartridge fuses.
2. Time delay cartridge fuses.

C. Circuit Breakers

1. Standard molded case circuit breakers "bolted in" type.
2. Solid state circuit breakers.
3. Current limiting circuit breakers.
4. Enclosed circuit breakers.

1.2 SUBMITTALS

A. Shop drawings showing dimensions, location of equipment and method of installation.

B. Product Data: Manufacturer’s printed data, catalog cuts.

1.3 DISCONNECT SWITCHES

A. Fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover when switch is in ON position. Handle lockable in OFF position. Fuse clips shall be designed to accommodate Class R, J fuses.

B. Non-fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover when switch is in ON position. Handle lockable in OFF position.

C. Enclosures: NEMA Type 1, 3R or 4 as required.

1.4 FUSES

A. Voltage ratings of fuses shall be suitable for the supply characteristics to which they are applied.

B. Fuse type and size shall be suitable for installation in related disconnect switch or circuit breaker.

C. Current limiting fuses shall be as follows:

1. Regardless of actual available fault current, they shall, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical or 280,000 amperes RMS asymmetrical, deliverable at the line side of the fuse.

2. They shall have average melting time-current characteristics to meet the Underwriters' Laboratories requirements for "Class RK-1" 0-600 amp fuses.

D. Regardless of actual available fault current, they shall be capable of limiting peak let through current to the following values based on 200,000 amperes RMS symmetrical or 280,000 amperes asymmetrical being available:

Rating In Amperes	Peak Let Through Current In Amps
15-30	6,000
35-50	8,000
70-100	12,000
125-200	20,000
225-601	38,000

E. Fuses shall be rejection type. Fuse clip shall be rejection type.

F. Fuse Type and Application Table:

Category of Application	Acceptable Fuse Types (Bussman Designations @ 600V)
Motor feeder	LPS below 600A
Power panel feeders	LPS below 600A
Safety switches	LPS

1.5 CIRCUIT BREAKERS

A. "Bolted-In" type, manually operated, quick-make, quick-break, mechanically trip-free operating mechanisms for simultaneous operation, of all poles, with contacts, arc interrupters and trip elements for each pole. "Plug-in" breakers are not permitted. New circuit breakers to be installed in existing panelboards shall be U.L. certified for installation in those panelboards and be labeled with make and model.

B. Tripping units shall be "thermal-magnetic" type having bimetallic elements for time delay overload protection, and magnetic elements for short circuit protection.

C. Manually operable by mean of toggle type operating handles having tripped positions midway between the "on-off" position. Handle to be clearly labeled as to breaker rating.

D. Minimum frame size for all circuit breakers, 1, 2, or 3 pole shall be 100 amperes.

E. Their interrupting rating shall not be less than 25,000 amperes RMS symmetrical at 208 volt for distribution panels and 10,000 amperes for power panels.

1.6 APPLICATIONS

A. Category of Application for Fuses:

1. Feeders on switchboards.

2. Branch fused switch unit in distribution panel.

3. Fused safety switch.

4. Combination motor starters.

B. Category of Application for Circuit Breakers:

1. Panelboards.

2. Switchboards.

3. Individual enclosures.

4. Combination motor starters.

1.7 SPARE FUSES

A. Upon Engineer's acceptance of the electrical distribution system, provide spare fuses as follows: 10% of each type and rating installed 600 amperes and smaller (minimum of 3). Provide spare fuse cabinet with directory to store all spare fuses. Locate as directed by Engineer and/or Owner.

1.8 APPROVED MANUFACTURERS

A. Fuses: Bussman, Ferraz-Shawmut.

B. Circuit Breakers: Siemens, General Electric, Square D.

1.9 INSTALLATION

A. All material installation shall be in accordance with manufacturer recommendations and the provisions of all applicable codes.

B. All fuses and circuit breakers shall be selectively coordinated.

C. Install disconnect switches where indicated on Drawings.
D. Install fuses in fusible disconnect switches.

E. Disconnects shall have NEMA 3R enclosure.

1.10 RECORD DRAWINGS

A. Shop drawings showing dimensions, location of equipment and method of installation.

B. Product Data: Manufacturer’s printed data, catalog cuts, performance curves.

END OF SECTION 260320

SECTION 260350 - BOXES

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install wall and ceiling outlet boxes, floor boxes, pull and junction boxes to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Access doors.

B. Wiring devices: Service fittings and fire-rated poke-through fittings for floor boxes.

C. Cabinets and enclosures.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Sheet metal outlet boxes: ANSI/NEMA OS 1; Galvanized steel, with 1/2 inch male fixture studs where required.

B. Cast boxes: Cast feralloy, deep type, gasketed cover, threaded hubs.

C. Typical receptacle box shall be 4" square metal boxes, 30.8 cubic inch capacity with brackets as required. Provide 4" square raised device covers.

2.2 PULL AND JUNCTION BOXES

A. Sheet metal boxes: ANSI/NEMA OS 1; Galvanized steel.

B. Sheet metal boxes larger than 12 inches in any dimension: hinged enclosure in accordance with Section 26 04 50.

C. Cast metal boxes for outdoor and wet location installations: NEMA 250; Type 4 and type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

D. Cast metal boxes for underground installation: NEMA 250; Type 4, inside flanged, recessed cover box for flush mounting, UL listed as raintight. Galvanized cast iron box and plain cover with neoprene gasket and stainless cover screws.

PART 3 - EXECUTION

3.1 COORDINATION OF BOX LOCATIONS

A. Provide electrical boxes as required in excess of that shown on Drawings and as required for splices, taps, wire pulling, equipment connections and code compliance.

B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.

C. Locate and install boxes to allow access. Where installations are accessible, coordinate locations and sizes of required access doors with Division 1.

D. Locate and install to maintain headroom and to present neat appearance.

3.2 OUTLET BOX INSTALLATION

A. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24 inch separation in acoustic-rated walls.

B. Locate boxes in masonry walls to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat openings for boxes.

C. Provide knockout closures for unused openings.

D. Support boxes independently of conduit except for cast iron boxes that are connected of rigid metal conduits, both supported within 12 inches of box.

E. Use multiple-gang boxes where more than one device is mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.

F. Install boxes in wall without damaging wall insulation.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches and backspaces.

H. Position outlets to locate luminaries as shown on reflected ceiling plans.

I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.

J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.

L. Provide cast outlet boxes in exterior locations exposed to the weather and wet locations.

3.3 PULL AND JUNCTION BOX INSTALLATION

A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.

B. Support pull and junction boxes independent of conduit.

END OF SECTION 260350

SECTION 260400 - WIRING DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install receptacles, service fittings device plates and box covers to complete all work shown on the Drawings or specified herein.

1.2 REFERENCES

A. FS W-C-596 - Electrical power connector, plug, receptacles and cable outlet.

B. FS W-S-896 - Switch, toggle.

C. NEMA WD 1 - General purpose wiring devices.

D. NEMA WD 5 - Specific-purpose wiring devices.

1.3 SUBMITTALS

A. Submit product data under Provisions of Contract and Division 1.

B. Provide product data showing configurations, finishes, dimensions and manufacturer's instructions.

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. Convenience and straight-blade receptacles: 125 V, 2 pole, 3 wire, 20 ampere specification grade, ground fault interrupting or isolated ground type.

B. Internal ground clip of receptacles shall be in one piece with the receptacle mounts.

C. Receptacles with riveted ground clips will not be accepted.

D. Isolated ground type receptacle shall be orange in color.

2.2 WALL SWITCHES

A. Wall switches for lighting circuits and motor loads under 1/2 hp: AC general use snap switch with toggle handle, rated 20 amperes and 120-277 volts AC.

B. Handle: Ivory plastic.

C. Pilot light type: Lighted handle. Pilot strap in adjacent gang.

D. Locator type: Lighted handle.

2.3 COVER PLATES

A. Decorative cover plate: Stainless steel 302/304 smooth Hubbell "S" series.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install receptacles on roof along parapet wall.

B. Install specific use receptacles at heights shown on contract drawings.

C. Drill opening for poke - through fitting installation in accordance with manufacturer's instructions.

D. Install plates on switch, receptacle, and blank outlets in finished areas, using jumbo size plates for outlets installed in masonry walls.

E. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings and on surface mounted outlets.

F. Install devices and wall plates flush and level.

END OF SECTION 260400

SECTION 260425 - DIGITAL LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 SUMMARY

A. Section Includes

1. Digital Lighting Controls
2. Relay Panels
3. Emergency Lighting Control (if applicable)

B. Related Sections

1. Section 26 04 00 Wiring Devices: Receptacles
2. Section 26 05 75 Interior Luminaires.
3. Electrical Sections, including wiring devices, apply to the work of this Section.

C. Control Intent – Control Intent includes, but is not limited to:

1. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
2. Initial sensor and switching zones
3. Initial time switch settings
4. Task lighting and receptacle controls
5. Emergency Lighting control (if applicable)

1.2 REFERENCES

A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)

B. Underwriter Laboratories of Canada (ULC)

C. International Electrotechnical Commission (IEC)

D. International Organization for Standardization (ISO)

E. National Electrical Manufacturers Association (NEMA)

F. WD1 (R2005) - General Color Requirements for Wiring Devices.

G. Underwriters Laboratories, Inc. (UL)

1. 20 – Plug Load Controls
2. 508– Industrial Controls
3. 916 – Energy Management Equipment.
4. 924 – Emergency Lighting

1.3 SYSTEM DESCRIPTION & OPERATION

A. The Lighting Control and Automation system as defined under this section covers the following equipment:

1. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
2. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active infrared (IR) communications.
3. Handheld remotes for personal control – One-button dimming, two-button on/off, or five-button scene remotes provide control using infrared communications. Remote may be configured in the field to control selected loads or scenes without special tools.
4. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.
5. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0-10 volt or line voltage forward phase control dimming outputs and integral current monitoring capabilities.
6. Digital Plug-Load Controllers – Self-configuring, digitally addressable, single relay, plenum-rated application-specific controllers. Selected models include integral current monitoring capabilities.
7. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings.
8. Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.
9. Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control
10. Network Bridge – provides BACnet MS/TP-compliant digital networked communication between rooms, panels and the Segment Manager or building automation system (BAS) and automatically creates BACnet objects representative of connected devices.
11. Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting.
12. Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.
13. LMCP Digital Lighting Management Relay Panel – provides up to 8, 24, or 48 mechanically latching relays. Relays include a manual override and a single push-on connector for easy installation or removal from the panel. Panel accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides

BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).

14. LMZC-301 – Digital Zone Controller. Accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).
15. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building.

1.4 LIGHTING CONTROL APPLICATIONS

A. Unless relevant provisions of the applicable local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:
   1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces except toilet rooms, storerooms, library stacks, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room, open plan system and training room. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and Manual-ON switches.
   2. Bi-Level Lighting – Provide multi-level controls in all spaces except toilet rooms, storerooms, library stacks, or applications where variable dimming is used.
   3. Task Lighting / Plug Loads – Provide automatic shut off of non essential plug loads and task lighting in all spaces except toilet rooms and storerooms. Provide Automatic-ON of plug loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with the overhead lighting may be used for the area.
   4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant local building energy code:
      a. All luminaires within code-defined daylight zones shall be controlled separately from luminaires outside of daylit zones.
      b. Daytime setpoints for total ambient illumination (combined daylight and electric light) levels that initiate dimming shall be programmed in compliance with relevant local building energy codes.
      c. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.
      d. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to turn off electric lighting when daylight is at or above required lighting levels, only if system functions to turn lamps back on at dimmed level, rather than turning full-on prior to dimming.
   5. Conference, meeting, training, auditoriums, and multipurpose rooms shall have controls that allow for independent control of each local control zone. Rooms larger than 300 square feet shall instead have at least four (4) pre-set lighting scenes unless otherwise specified. Occupancy / vacancy sensors shall be provided to extinguish all lighting in the space. Spaces with up to four moveable walls shall include controls that can be reconfigured when the room is partitioned.

1.5 SUBMITTALS

A. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.

B. Shop Drawings

1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
2. Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans.)
3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.

C. Product Data: Catalog sheets, specifications and installation instructions.

D. Include data for each device which:

1. Indicates where sensor is proposed to be installed.
2. Prove that the sensor is suitable for the proposed application.

1.6 QUALITY ASSURANCE

A. Manufacturer: Minimum [10] years experience in manufacture of lighting controls.

1.7 PROJECT CONDITIONS

A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:

1. Ambient temperature: 0° to 40° C (32° to 104° F).
2. Relative humidity: Maximum 90 percent, non-condensing.

1.8 WARRANTY

A. Provide a five year limited manufacturer’s warranty on all room control devices and panels.

1.9 MAINTENANCE

A. Spare Parts

1. Provide spares of each product to be used for maintenance as listed below: Refer to design documents. Coordinate with owner for quantity prior to purchase order.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer

1. WattStopper
   a. System: Digital Lighting Management (DLM)

2. Basis of design product: WattStopper Digital Lighting Management (DLM) or subject to compliance and prior approval with specified requirements of this section, one of the following:
   a. Refer to design documents.

B. Substitutions: [If Permitted]

1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.

2. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design highlighted for review and approval prior to rough-in.

2.2 DIGITAL LIGHTING CONTROLS

A. Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.3 DIGITAL WALL SWITCH OCCUPANCY SENSORS

A. Wallbox mounted passive infrared PIR or dual technology (passive infrared and ultrasonic) digital occupancy sensor with 1 or 2 switch buttons.

B. Digital Occupancy Sensors shall provide scrolling LCD display for digital calibration and electronic documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:

   a. Sensitivity – 0-100% in 10% increments
   b. Time delay – 1-30 minutes in 1 minute increments
   c. Test mode – Five second time delay
   d. Detection technology – PIR, Dual Technology activation and/or re-activation.
   e. Walk-through mode
   f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:

   a. Each sensor may be programmed to control specific loads within a local network.
   b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
   c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically during the configurable period of time (default 10 seconds) after turning off.
   d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
      i Ultrasonic and Passive Infrared
      ii Ultrasonic or Passive Infrared
      iii Ultrasonic only
      iv Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.

4. Two RJ-45 ports for connection to DLM local network.

5. Two-way infrared (IR) transceiver to allow remote programming through handheld configuration tool and control by remote personal controls.

6. Device Status LEDs including:
   a. PIR detection
   b. Ultrasonic detection
   c. Configuration mode
   d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.

8. Assignment of local buttons to specific loads within the room without wiring or special tools.

9. Manual override of controlled loads.

10. All digital parameter data programmed into an individual wall switch sensor shall be retained in non-volatile FLASH memory within the wall switch sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet object information shall be available for the following objects:

1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic
4. Button state
5. Switch lock control
6. Switch lock status

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

F. Two-button wall switch occupancy sensors, when connected to a single relay dimming room controller, shall operate in the following sequence as a factory default:
   1. Left button
      a. Press and release - Turn load on
      b. Press and hold - Raise dimming load
   2. Right button
      a. Press and release - Turn load off
      b. Press and hold - Lower dimming load

G. Low voltage momentary pushbuttons shall include the following features:

   1. Load/Scene Status LED on each switch button with the following characteristics:

      a. Bi-level LED
      b. Dim locator level indicates power to switch
      c. Bright status level indicates that load or scene is active

   2. The following button attributes may be changed or selected using a wireless configuration tool:

      a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
      b. Individual button function may be configured to Toggle, On only or Off only.
      c. Individual scenes may be locked to prevent unauthorized change.
      d. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
      e. Ramp rate may be adjusted for each dimmer switch.
      f. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

H. WattStopper part numbers: LMPW, LMDW. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.4 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

A. Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor.

B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:

   1. Digital calibration and pushbutton configuration for the following variables:
      a. Sensitivity – 0-100% in 10% increments
      b. Time delay – 1-30 minutes in 1 minute increments
      c. Test mode – Five second time delay

d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
e. Walk-through mode
f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:
   a. Each sensor may be programmed to control specific loads within a local network.
   b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
   c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically within a configurable period of time (default 10 seconds) after turning off.
   d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
      i Ultrasonic and Passive Infrared
      ii Ultrasonic or Passive Infrared
      iii Ultrasonic only
      iv Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.

4. One or two RJ-45 port(s) for connection to DLM local network.

5. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.

6. Device Status LEDs, which may be disabled for selected applications, including:
   a. PIR detection
   b. Ultrasonic detection
   c. Configuration mode
   d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.

8. Manual override of controlled loads.

9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet object information shall be available for the following objects:

1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

F. WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.5 DIGITAL WALL SWITCHES

A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration. Wall switches shall include the following features:

1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.

2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.

3. Configuration LED on each switch that blinks to indicate data transmission.

4. Load/Scene Status LED on each switch button with the following characteristics:
   a. Bi-level LED
   b. Dim locator level indicates power to switch
   c. Bright status level indicates that load or scene is active

5. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.

6. Programmable control functionality including:
   a. Button priority may be configured to any BACnet priority level, from 1-16, corresponding to networked operation allowing local actions to utilize life safety priority
   b. Scene patterns may be saved to any button other than dimming rockers. Once set, buttons may be digitally locked to prevent overwriting of the preset levels.

7. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.

B. BACnet object information shall be available for the following objects:
   1. Button state
   2. Switch lock control
   3. Switch lock status

C. Two RJ-45 ports for connection to DLM local network.

D. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.

E. The following switch attributes may be changed or selected using a wireless configuration tool:

1. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
2. Individual button function may be configured to Toggle, On only or Off only.
3. Individual scenes may be locked to prevent unauthorized change.
4. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
5. Ramp rate may be adjusted for each dimmer switch.
6. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

F. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.6 HANDHELD REMOTE CONTROLS

A. Battery-operated handheld devices in 1, 2 and 5 button configurations for remote switching or dimming control. Remote controls shall include the following features:

1. Two-way infrared (IR) transceiver for line of sight communication with DLM local network within up to 30 feet.

2. LED on each button confirms button press.

3. Load buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

4. Inactivity timeout to save battery life.

B. A wall mount holster and mounting hardware shall be included with each remote control.

C. WattStopper part numbers: LMRH-101, LMRH-102, LMRH-105.

2.7 DIGITAL PARTITION CONTROLS

A. Partition controls shall enable manual or automatic coordination of lighting controls in flexible spaces with up to four moveable walls by reconfiguring the connected digital switches and occupancy sensors.

B. Four-button low voltage pushbutton switch for manual control.

1. Two-way infrared (IR) transceiver for use with configuration remote control.
2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
3. Configuration LED on each switch that blinks to indicate data transmission.
4. Each button represents one wall; Green button LED indicates status.
5. Two RJ-45 ports for connection to DLM local network.

6. WattStopper part number: LMPS-104. Available in white, light almond, ivory, grey and black; compatible with wall plates with decorator opening.

C. Contact closure interface for automatic control via input from limit switches on movable walls (by others).

1. Operates on Class 2 power supplied by DLM local network.

2. Includes 24VDC output and four input terminals for maintained third party contract closure inputs.
   a. Input max. sink/source current: 1-5mA
   b. Logic input signal voltage High: >18VDC
   c. Logic input signal voltage Low: <2VDC

3. Four status LEDs under hinged cover indicate if walls are open or closed; supports LMPS-104 as remote status indicator.

4. Two RJ-45 ports for connection to DLM local network.

5. WattStopper part number: LMIO-102

2.8 DIGITAL DAYLIGHTING SENSORS

A. Digital daylighting sensors shall work with room controllers to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to a room controller. Daylighting sensors shall be interchangeable without the need for rewiring.

1. Closed loop sensors measure the ambient light in the space and control a single lighting zone.
2. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.
3. Dual loop sensors measure both ambient and incoming daylight in the space to insure that proper light levels are maintained as changes to reflective materials are made in a single zone.

B. Digital daylighting sensors shall include the following features:

1. The sensor’s internal photodiode shall only measure lightwaves within the visible spectrum. The photodiode’s spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
2. Sensor light level range shall be from 1-6,553 foot candles (fc).
3. The capability of ON/OFF, bi-level or tri-level switching, or dimming, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).
4. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the “ON Setpoint” and the “OFF Setpoint” that will prevent the lights from cycling excessively after they turn off.

5. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.
6. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.
7. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.
8. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
9. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
10. Configuration LED status light on device that blinks to indicate data transmission.
11. Status LED indicates test mode, override mode and load binding.
12. Recessed switch on device to turn controlled load(s) ON and OFF.
13. BACnet object information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:
    a. Light level
    b. Day and night setpoints
    c. Off time delay
    d. On and off setpoints
    e. Up to three zone setpoints
    f. Operating mode – on/off, bi-level, tri-level or dimming
14. One RJ-45 port for connection to DLM local network.
15. A choice of accessories to accommodate multiple mounting methods and building materials. The photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photosensors accommodate mounting materials from 0-0.62" thickness (LMLS-400, LMLS-500). Extended tube photosensors accommodate mounting materials from 0.62"-1.25" thickness (LMLS-400-L, LMLS-500-L). Mounting brackets are compatible with J boxes (LMLS-MB1) and wall mounting (LMLS-MB2). LMLS-600 photosensor to be mounted on included bracket below skylight well.
16. Any load or group of loads in the room can be assigned to a daylighting zone
17. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).
18. All digital parameter data programmed into a photosensor shall be retained in non-volatile FLASH memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.

C. Closed loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from bright sources outside of this cone.
2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.

3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of loads.
4. WattStopper Product Number: LMLS-400, LMLS-400-L.

D. Open loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 60-degree angle cutting off the unwanted light from the interior of the room.
2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling; for dimming operation, a proportional control algorithm shall maintain the design lighting level in each zone.
3. Each of the three discrete daylight zones can include any non overlapping group of loads in the room.
4. WattStopper Product Number: LMLS-500, LMLS-500-L.

E. Dual loop digital photosensors shall include the following additional features:

1. Close loop portion of dual loop device must have an internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from sources outside of this con.
2. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60 degree angle, cutting off the unwanted light from the interior of the room.
3. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.
4. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.
5. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.
6. Device must include extendable mounting arm to properly position sensor within a skylight well.
7. WattStopper product number LMLS-600

2.9 DIGITAL ROOM CONTROLLERS AND PLUG-LOAD CONTROLLERS

A. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, and will not have dip

switches or potentiometers, or require special configuration for standard Plug n' Go applications. The control units will include the following features:

1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.

2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.

3. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device ID's from highest to lowest.

4. Device Status LEDs to indicate:
   a. Data transmission
   b. Device has power
   c. Status for each load
   d. Configuration status

5. Quick installation features including:
   a. Standard junction box mounting
   b. Quick low voltage connections using standard RJ-45 patch cable

6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
   a. Turn on to 100%
   b. Remain off
   c. Turn on to last level
7. Each load shall be configurable to operate in the following sequences based on occupancy:

   a. Auto-on/Auto-off (Follow on and off)
   b. Manual-on/Auto-off (Follow off only)

8. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.

9. BACnet object information shall be available for the following objects:

   a. Load status
   b. Electrical current
   c. Total watts per controller
   d. Schedule state – normal or after-hours
   e. Demand response control and cap level
   f. Room occupancy status
   g. Total room lighting and plug loads watts
   h. Total room watts/sq ft
   i. Force on/off all loads

10. UL 2043 plenum rated

11. Manual override and LED indication for each load

12. Dual voltage (120/277 VAC, 60 Hz), or 347 VAC, 60 Hz (selected models only). 120/277 volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347 volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.

13. Zero cross circuitry for each load

14. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.

B. On/Off Room Controllers shall include:

1. One or two relay configuration
2. Efficient 150 mA switching power supply
3. Three RJ-45 DLM local network ports with integral strain relief and dust cover
4. WattStopper product numbers: LMRC-101, LMRC-102

C. On/Off/Dimming enhanced Room Controllers shall include:

1. Real time current monitoring

2. Multiple relay configurations

   a. One, two or three relays (LMRC-21x series)
   b. One or two relays (LMRC-22x series)

3. Efficient 250 mA switching power supply

4. Four RJ-45 DLM local network ports with integral strain relief and dust cover

5. One dimming output per relay

   a. 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series)
   b. Line Voltage, Forward Phase Dimming - Where indicated, one forward phase control line voltage dimming output per relay for control of compatible two-wire or three-wire ballasts, LED drivers, MLV, forward phase compatible ELV, neon/cold cathode and incandescent loads. (LMRC-22x series)
   c. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.
   d. The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.

e. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
f. Calibration and trim levels must be set per output channel.
g. Devices that set calibration or trim levels per controller are not acceptable.
h. All configuration shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.

6. Each load shall have an independently configurable preset on level for Normal Hours and After Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After Hours events.

7. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.

8. The following dimming attributes may be changed or selected using a wireless configuration tool:
   a. Establish preset level for each load from 0-100%
   b. Set high and low trim for each load
   c. Set lamp burn in time for each load up to 100 hours

9. Override button for each load provides the following functions:
   a. Press and release for on/off control
   b. Press and hold for dimming control

10. WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMRC-221, LMRC-222

D. Plug Load Room Controllers shall include:

1. One relay configuration with additional connection for un-switched load
2. Configurable additive time delay to extend plug load time delay beyond occupancy sensor time delay (e.g. a 10 minute additive delay in a space with a 20 minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).
3. Factory default operation is Auto-on/Auto-off, based on occupancy
4. Real time current monitoring of both switched and un-switched load (LMPL-201 only)
5. Efficient switching power supply
   a. 150mA (LMPL-101)
   b. 250mA (LMPL-201)
6. RJ-45 DLM local network ports
   a. Three RJ-45 ports (LMPL-101)
   b. Four RJ-45 ports (LMPL-201)
7. WattStopper product numbers: LMPL-101, LMPL-201.

2.10 DLM LOCAL NETWORK (Room Network)

A. The DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.

B. Features of the DLM local network include:

1. Plug n' Go® automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.
3. Push n' Learn® configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

C. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.

D. If manufacturer's pre-terminated Cat 5e cables are not used for the installation, the contractor is responsible for testing each cable following installation and supplying manufacturer with test results.

E. WattStopper Product Number: LMRJ-Series

2.11 DLM SEGMENT NETWORK (Room to Room Network)

A. The segment network shall be a linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.

1. Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.

2. Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate "in" and "out" terminations, for segment network connections.

3. The segment network shall utilize 1.5 twisted pair, shielded, cable supplied by the lighting control manufacturer. The maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30 pf/ft and have a characteristic impedance of 120 Ohms.

4. Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.

5. Substitution of manufacturer-supplied cable must be pre-approved: Manufacturer will not certify network reliability, and reserves the right to void warranty, if non-approved cable is installed, and if terminations are not completed according to manufacturer's specific requirements.

6. Segment networks shall be capable of connecting to BACnet-compliant BAS (provided by others) either directly, via MS/TP, or through NB-ROUTERs, via BACnet/IP or BACnet/Ethernet. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.

B. WattStopper Product Number: LM-MSTP, LM-MSTP-DB

2.12 CONFIGURATION TOOLS

A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.

B. Features and functionality of the wireless configuration tool shall include but not be limited to:

1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.

2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.

3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.

4. Save up to eight occupancy sensor setting profiles and apply profiles to selected sensors.

5. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.

6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.

7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.

8. Verify status of building level network devices.

C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

2.13 NETWORK BRIDGE

A. The network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.

1. The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.

2. Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.

3. The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:

    a. Read/write the normal or after hours schedule state for the room
    b. Read the detection state of each occupancy sensor
    c. Read the aggregate occupancy state of the room
    d. Read/write the On/Off state of loads
    e. Read/write the dimmed light level of loads
    f. Read the button states of switches
    g. Read total current in amps, and total power in watts through the room controller
    h. Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings
    i. Activate a preset scene for the room
    j. Read/write daylight sensor fade time and day and night setpoints
    k. Read the current light level, in foot candles, from interior and exterior photosensors and photocells
    l. Set daylight sensor operating mode
    m. Read/write wall switch lock status
    n. Read watts per square foot for the entire controlled room
    o. Write maximum light level per load for demand response mode
    p. Read/write activation of demand response mode for the room
    q. Activate/restore demand response mode for the room

B. WattStopper product numbers: LMBC-300

2.14 SEGMENT MANAGER

A. For networked applications, the Digital Lighting Management system shall include at least one segment manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256 bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443).

B. Each segment manager shall have integral support for at least three segment networks. Segment networks may alternately be connected to the segment manger via external routers and switches, using standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the plans.

C. Operational features of the Segment Manager shall include the following:

1. Connection to PC or LAN via standard Ethernet TCP/IP via standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic.
2. Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. Shall not require installation of any lighting control software to an end-user PC.
3. Log in security capable of restricting some users to view-only or other limited operations.
4. Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels.
5. After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the user.
6. Ability to view and modify room device operational parameters. It shall be possible to set device parameters independently for normal hours and after hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On.
7. Ability to set up schedules for rooms and panels, view and override current status of panel channels and relays, and assign relays to groups. Schedules shall automatically set controlled zones or areas to either a normal hours or after hours mode of operation. Support for a minimum of 100 unique schedules, each with up to four time events per day. Support for annual schedules, holiday schedules and unique date-bound schedules.
8. Ability to group rooms and loads for common control by schedules, switches or network commands.
9. Ability to monitor connected load current and display power consumption for areas equipped with room controllers incorporating the integral current monitoring feature.
10. Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control.
11. The Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable.

D. Segment Manager shall support multiple DLM rooms as follows:
1. Support up to 120 network bridges and 900 digital in-room devices (LMSM-3E).
2. Support up to 300 network bridges and 2,200 digital in room devices, connected via network routers and switches (LMSM-6E).

E. WattStopper Product Numbers: LMSM-3E, LMSM-6E, NB-ROUTER, NB-SWITCH, NB-SWITCH-8, NB-SWITCH-16.

2.15 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

A. PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.

1. Additional parameters exposed through this method include but are not limited to:
   a. Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.
   b. Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.
   c. Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.
   d. Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.
   e. Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.
   f. Load control polarity reversal so that on events turn loads off and vice versa.
   g. Per-load DR (demand response) shed level in units of percent.
   h. Load output pulse mode in increments of 1second.
   i. Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered On of switched loads in response to a dimmer.
2. Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:
   a. Device list report: All devices in a project listed by type.
   b. Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.
   c. BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.
   d. Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.
   e. Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.
   f. Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100%, 2 = all loads 75%, 3 = all loads 50%, 4 = all loads 25%, 5-16 = same as scene 1).
   g. Occupancy sensor report: Basic settings including time delay and sensitivity(ies) for all occupancy sensors.

3. Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:
   a. Set, copy/paste an entire project site of sensor time delays.
   b. Set, copy/paste an entire project site of sensor sensitivity settings.
   c. Search based on room name and text labels.
   d. Filter by product type (i.e. LMRC-212) to allow parameter set by product.
   e. Filter by parameter value to search for product with specific configurations.

4. Network-wide firmware upgrading remotely via the BACnet/IP network.
   a. Mass firmware update of entire rooms.
   b. Mass firmware update of specifically selected rooms or areas.
   c. Mass firmware upgrade of specific products.

B. WattStopper Product Number: LMCS-100, LMCI-100

2.16 LMCP LIGHTING CONTROL PANELS

A. Provide lighting control panels in the locations and capacities as indicated on the plans and schedules. Each panel shall be of modular construction and consist of the following components:

1. Enclosure/Tub shall be NEMA 1, sized to accept an interior with 1 - 8 relays, 1 - 24 relays and 6 four-pole contactors, or 1 - 48 relays and 6 four-pole contactors.

2. Cover shall be configured for surface or flush wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel.

3. Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (Class 1) wiring from low voltage (Class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays. The panel interiors shall include the following features:
   a. Removable, plug-in terminal blocks with connections for all low voltage terminations.
   b. Individual terminal block, override pushbutton, and LED status light for each relay.
   c. Direct wired switch inputs associated with each relay shall support 2-wire momentary switches only.
   d. Digital inputs (four RJ-45 jacks) shall support 1-, 2-, 3-, 4-, and 8-button digital switches; digital IO modules capable of receiving 0-5V or 0-10V analog photocell inputs; digital IO modules capable of receiving momentary or maintained contact closure inputs or analog sensor inputs; digital daylighting sensors; and digital occupancy sensors. Inputs are divided into two separate digital networks, each capable of supplying 250mA to connected devices.
   e. True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems via BACnet.

f. Automatically sequenced operation of relays to reduce impact on the electrical distribution system when large loads are controlled simultaneously.

g. Group and pattern control of relays shall be provided through a simple keypad interface from a handheld IR programmer. Any set of relays can be associated with a group for direct on/off control or pattern (scene) control via a simple programming sequence using the relay override pushbuttons and LED displays for groups 1-8 or a handheld IR programmer for groups 1-99.

h. Relay group status for shall be provided through LED indicators for groups 1-8 and via BACnet for groups 1-99. A solid LED indicates that the last group action called for an ON state and relays in the group are on or in a mixed state.

i. Single-pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:

a) Electrical:

i 30 amp ballast at 277V
ii 20 amp ballast at 347V
iii 20amp tungsten at 120V
iv 30 amp resistive at 347V
v 1.5 HP motor at 120V
vi 14,000 amp short circuit current rating (SCCR) at 347V
vii Relays shall be specifically UL 20 listed for control of plug-loads

b) Mechanical:

i Replaceable, ½" KO mounting with removable Class 2 wire harness.
ii Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel.
iii Dual line and load terminals each support two #14 - #12 solid or stranded conductors.
iv Tested to 300,000 mechanical on/off cycles.

4. Isolated low voltage contacts provide for true relay status feedback and pilot light indication.

5. Power supply shall be a multi-voltage transformer assembly with rated power to supply all electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the project requirements. Power supply to have internal over-current protection with automatic reset and metal oxide varistor protection.

6. Where indicated, lighting control panels designated for control of emergency lighting shall be provided with factory installed provision for automatic by pass of relays controlling emergency circuits upon loss of normal power. Panels shall be properly listed and labeled for use on emergency lighting circuits and shall meet the requirements of UL924 and NFPA 70 - Article 700.

7. Integral system clock shall provide scheduling capabilities for panel-only projects without DLM segment networks or BAS control.

a. Each panel shall include digital clock capability able to issue system wide automation commands to up to (11) eleven other panels for a total of (12) twelve networked lighting control panels. The clock shall provide

capability for up to 254 independent schedule events per panel for each of the ninety-nine system wide channel groups.

b. The clock capability of each panel shall support the time-based energy saving requirements of applicable local energy codes.

c. The clock module shall provide astronomic capabilities, time delays, blink warning, daylight savings, and holiday functions and will include a battery backup for the clock function and program retention in non-volatile FLASH memory. Clocks that require multiple events to meet local code lighting shut off requirements shall not be allowed.

d. The clock capability of each panel shall operate on a basis of ON/OFF or Normal Hours/After Hours messages to automation groups that implement pre-configured control scenarios. Scenarios shall include:
   i Scheduled ON / OFF
   ii Manual ON / Scheduled OFF
   iii Astro ON / OFF (or Photo ON / OFF)
   iv Astro and Schedule ON / OFF (or Photo and Schedule ON / OFF)

e. The user interface shall be a portable IR handheld remote control capable of programming any panel in the system (LMCT-100)

f. The clock capability of each panel shall employ non-volatile memory and shall retain user programming and time for a minimum of 10 years.

g. Schedules programmed into the clock of any one panel shall be capable of executing panel local schedule or Dark/Light (photocell or Astro) events for that panel in the event that global network communication is lost. Lighting control panels that are not capable of executing events independently of the global network shall not be acceptable.

8. The lighting control panel can operate as a stand-alone system, or can support schedule, group, and photocell control functions, as configured in a Segment Manager controller, via a segment network connection.

9. The lighting control panel shall support digital communications to facilitate the extension of control to include interoperation with building automation systems and other intelligent field devices. Digital communications shall be RS485 MS/TP-based using the BACnet® protocol.

   a. The panel shall have provision for an individual BACnet device ID and shall support the full 2^{22} range (0 – 4,193,304). The device ID description property shall be writable via the network to allow unique identification of the lighting control panel on the network.

   b. The panel shall support MS/TP MAC addresses in the range of 0 – 127 and baud rates of 9600k, 38400k, 76800k, and 115.2k bits per second.

   c. Lighting control relays shall be controllable as binary output objects in the instance range of 1 – 64. The state of each relay shall be readable and writable by the BAS via the object present value property.

   d. Lighting control relays shall report their true on/off state as binary input objects in the instance range of 1 – 64.

   e. The 99 group Normal Hours/After Hours control objects associated with the panel shall be represented by binary value objects in the instance range of 201 – 299. The occupancy state of each channel group shall be readable and writable by the BAS via the object present value property. Commanding 1 to a channel group will put all relays associated with the channel into the normal hours mode. Commanding 0 or NULL shall put the relays into the afterhours mode.

f. Setup and commissioning of the panel shall not require manufacturer-specific software or a computer. All configuration of the lighting control panel shall be performed using standard BACnet objects or via the handheld IR programming remote. Provide BACnet objects for panel setup and control as follows:
   i Binary output objects in the instance range of 1 – 64 (one per relay) for on/off control of relays.
   ii Binary value objects in the instance range of 1 – 99 (one per channel) for normal hours/after hours schedule control.
   iii Binary input objects in the instance range of 1 – 64 (one per relay) for reading true on/off state of the relays.
   iv Analog value objects in the instance range of 101 – 199 (one per channel group) shall assign a blink warn time value to each channel. A value of 5 shall activate the blink warn feature for the channel and set a 5-minute grace-time period. A value of 250 shall activate the sweep feature for the channel and enable the use of sweep type automatic wall switches.
   g. The description property for all objects shall be writable via the network and shall be saved in non-volatile memory within the panel.
   h. The BO and BV 1 – 99 objects shall support BACnet priority array with a relinquish default of off and after hours respectively. Prioritized writes to the channel BV objects shall propagate prioritized control to each member relay in a way analogous to the BACnet Channel object described in addendum . (http://www.bacnet.org/Addenda/Add-135-2010aa.pdf)
   i. Panel-aggregate control of relay Force Off at priority 2 shall be available via a single BV5 object. Force On at priority 1 shall be available via a single BV4 object.
   j. Lockout of all digital switch buttons connected to a given panel shall be command-able via a single BV2 object. The lock status of any connected switch station shall be represented as BV101-196.

10. WattStopper Product Number: LMCP8, LMCP24 or LMCP48

B. User Interface: Each lighting control panel system shall be supplied with at least (1) handheld configuration tool (LMCT-100). As a remote programming interface the configuration tool shall allow setup, configuration, and diagnostics of the panel without the need for software or connection of a computer. The user interface shall have the following panel-specific functions as a minimum.
   1. Set network parameters including panel device ID, MS/TP MAC address, baud rate and max master range.
   2. Relay Group creation of up to 99 groups. Group creation shall result in programming of all seven key relay parameters for member relays. The seven parameters are as follows: After-hours Override Time Delay, Normal Hours Override Time Delay, Action on Transition to Normal Hours, Action on Transition to After Hours, Sensor Action During Normal Hours, Sensor Action During After Hours, Blink-Warn Time for After Hours.
   3. Program up to 254 separate scheduled events. Events shall occur on seven day intervals with each day selectable as active or inactive and shall be configurable as to whether the event is active on holidays. Holidays are also defined through the User Interface.

4. Program up to 32 separate Dark/Light events. Events shall have a selectable source as either calculated Astro with delay, or a digital IO module with an integral 0-5V or 0-10V analog photocell. Dark/Light events shall occur on seven day intervals with each day selectable as active or inactive and shall be configurable as to whether the event is active on holidays.
5. Button binding of digital switches to groups shall be accessible via the handheld IR remote and accomplished from the digital switch station.
6. Programming of panel location information shall be accomplished by the handheld IR remote and include at a minimum LAT, LON, DST zone, and an approximate city/state location.
7. An additional handheld IR remote may optionally be specified to be permanently mounted to the panel interior via a retractable anti-theft lanyard to allow for convenient programming of the panel while assuring that the handheld programmer is always present at that panel. An unlimited number of handheld IR remotes may also be purchased for facilities staff as determined by the end user's representative.
8. WattStopper Product Number: LMCT-100

2.17 EMERGENCY LIGHTING CONTROL DEVICES

A. Emergency Lighting Control Unit – A UL 924 listed device that monitors a switched circuit providing normal lighting to an area. The unit provides normal ON/OFF control of emergency lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features include:
   1. 120/277 volts, 50/60 Hz, 20 amp ballast rating
   2. Push to test button
   3. Auxiliary contact for remote test or fire alarm system interface

B. WattStopper Product Numbers: ELCU-100, ELCU-200.

PART 3 – EXECUTION

3.1 OPTIONAL PRE-INSTALLATION MEETING

A. A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:
   1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.
   2. Review the specifications for low voltage control wiring and termination.
   3. Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.
   4. Discuss requirements for integration with other trades.

3.2 CONTRACTOR INSTALLATION AND SERVICES

A. Contractor to install all devices and wiring in a professional manner. All line voltage connections to be tagged to indicate circuit and switched legs.

B. Contractor to install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation and shall supply the lighting controls manufacturers with test results. Contractor to install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.

C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, contractor shall test all devices to ensure proper communication.

D. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings. Adjust time delay so that controlled area remains lighted while occupied.

E. Provide written or computer-generated documentation on the configuration of the system including room by room description including:
   1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
   2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
   3. Load Parameters (e.g. blink warning, etc.)

F. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity.

3.3 FACTORY SERVICES

A. Upon completion of the installation, the manufacturer's factory authorized representative shall start up and verify a complete fully functional system.

B. The Electrical Contractor shall provide both the manufacturer and the electrical engineer with three weeks written notice of the system start up and adjustment date.

C. Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

3.4 OPTIONAL COMMISSIONING SUPPORT SERVICES

A. On this project, a commissioning agent will be hired to verify the installation and programming of all building systems, which includes the lighting control system. Manufacturer should include an extra day of technician's time to review the functionality and settings of the lighting control hardware with the commissioning agent, including reviewing submittal drawings and ensuring that instructions on how to configure each device are readily available. Manufacturer is NOT responsible for helping the commissioning agent inspect the individual devices. It will be the commissioning agent's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the agent with this task.

B. The commissioning agent shall work with the Electrical Contractor during installation of the lighting control hardware to become familiar with the specific products. The agent may also accompany the manufacturer's technicians during their start-up work to better understand the process of testing, calibration and configuration of the products. However, the contractor and manufacturer shall ensure that interfacing with the agent does not prevent them from completing the requirements outlined in the contract documents.

3.5 OPTIONAL ACCEPTANCE TESTING SUPPORT SERVICES

A. On all California projects, a certified lighting controls acceptance test technician (CLCATT) must verify the installation of the lighting control system. Manufacturer should include an extra day of factory technician's time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms. It will be the CLCATT's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the CLCATT with this task.

END OF SECTION 260425

SECTION 260450 - CABINETS AND ENCLOSURES

PART 1 - GENERAL

Applicable Provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install hinged cover enclosures to complete all work shown on the Drawings or specified herein.

1.2 REFERENCES

A. NEMA 250 - Enclosures for electrical equipment (1000 volts maximum).

B. Submittals - Submit product data under Provisions of Contract and Division 1.

PART 2 - PRODUCTS

2.1 HINGED COVER ENCLOSURES

A. Construction: NEMA 250; Type 1 and 3R steel.

B. Finished: Manufacturer's standard enamel finish.

C. Covers: Continuous hinge, held closed by operable by key.

D. Provide barriers between normal and emergency wiring. Barriers shall be of non-current carrying material of adequate thickness for mechanical strength but in no case less than 1/4”. Each barrier shall have an angle iron framing support all around.

2.2 FABRICATION

A. Shop assemble enclosures in accordance with ANSI/NEMA ISC 6.

B. Provide knockouts on enclosures.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosures plumb; Anchor securely to wall and structural supports at each corner, minimum.

B. Provide necessary feet for free-standing equipment enclosures.

C. Install trim plumb.

END OF SECTION 260450

SECTION 260500 - SUPPORTING DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install rigid metal conduit, electrical metallic tubing and flexible metal conduit, including all fittings to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Conduit and equipment supports.

B. Fastening hardware.

1.3 REFERENCES

A. Conduit supports.

1.4 QUALITY ASSURANCE

A. Support system shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Support channel: Galvanized or painted steel.

B. Hardware: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasteners in Pre-Cast Concrete: Fastener system of type for suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other necessary devices for attaching hangers of type required and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing in accordance to ASTM E1190 conducted by a qualified independent agency. Anchors shall not be installed where reinforcing strands are located in plank. Review pre-cast plank shop drawings to determine location.

B. Refer to pre-cast concrete plank shop drawings for location of strand reinforcing and cores. Do not anchor where reinforcing is located. Use fasteners in concrete, toggle bolts or thru-core anchors with plates supported on top of plank in cores.

C. Fasten hanger rods, conduit clamps, outlet, junction boxes to building structure using preset inserts, beam clamps and spring steel clips.

D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; Expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs and wood screws in wood construction.

E. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

F. Do not use powder-actuated anchors.

G. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

H. In wet locations install free-standing electrical equipment on concrete pads.

I. Install surface mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.

J. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

END OF SECTION 260500

SECTION 260550 - GENERAL LABELING AND IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install nameplates, tape labels, wire markers, conduit color coding to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Painting.

1.3 SUBMITTALS

A. Submit shop drawings under provisions of Division 1.

B. Include schedule for nameplates and tape labels.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background.

B. Tape labels: Embossed adhesive tape with 3/16 inch black letters on a white background.

C. Wire and cable markers: Cloth markers, split sleeve or tubing type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. De-grease and clean surfaces to receive nameplates and tape labels.

B. Install nameplates and tape labels parallel to equipment lines.

C. Secure nameplates to equipment fronts using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.

D. Embossed tape will not be permitted for any application. Use embossed tape only for identification of individual wall switches and receptacles and control device stations.

3.2 WIRE IDENTIFICATION

A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes and at load connection. Identify each branch circuit or feeder number for power and lighting circuits and each control wire number as indicated on equipment manufacturer's shop drawings for control wiring.

3.3 NAMEPLATE ENGRAVING SCHEDULE

A. Provide nameplates to identify all electrical distribution, control equipment and loads served including year of installation. Letter height: 1/2 inch for individual switches, loads served, distributions and control equipment identification. For example:

MP-1 INSTALLED 2024

B. Panelboards: 3/4 inch, identify equipment designation. 1/2 inch, identify voltage rating and source of power.

C. Individual circuit breakers, switches and motor starters in panelboards, switchboards and motor control centers: 1/4 inch, identify circuit and load served, including location.

D. Individual circuit breakers, enclosed switches and motor starters: 1/2 inch, identify load served.

3.4 FIRE ALARM

A. All fire alarm raceway components shall be painted red and identified.

END OF SECTION 260550

SECTION 260600 - DISCONNECT SWITCHES

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install disconnect switches, fuses and enclosures to complete all work shown on the Drawings or specified herein.

1.2 SUBMITTALS

A. Submit product data under Provisions of Contract and Division 1.

B. Include outline Drawings with dimensions, equipment ratings for voltage, capacity, horsepower and short circuit.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

A. Siemens.

B. Square 'D'.

C. General Electric.

D. Or approved equal.

2.2 DISCONNECT SWITCHES

A. Fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch is in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate class R, J fuses.

B. Non-fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

C. Enclosures: NEMA Type 1; 3R; 4 as indicated on Drawings.

2.3 ACCEPTABLE MANUFACTURERS - FUSES

A. Bussman.

B. Ferraz-Shawmut.

C. Or approved equal.

2.4 FUSES

A. Fuses 600 amperes and less: ANSI/UL 198E, class RK1; RK5; Dual element, current limiting, time delay, 250 volt.

B. Interrupting rating: 200,000 rms amperes.

C. An additional fuse of each size required to be supplied.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches where indicated on Drawings.

B. Install fuses in fusible disconnect switches.

C. Disconnects installed outdoors shall have NEMA 3R enclosures.

D. Disconnects installed indoors in dry locations shall have NEMA 1 enclosure.

END OF SECTION 260600

SECTION 260650 - GROUNDING

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install the power system grounding to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Panelboards.

B. Raceways.

C. Connection Equipment.

D. Electric Equipment.

E. Tests and Acceptance.

F. Transformers.

G. Electric Service.

1.3 SUBMITTALS

A. Manufacturers' data, catalog cuts of ground rods, connectors, bushings, etc., along with recommended installation procedures.

PART 2 - PRODUCTS

2.1 WIRING

A. All wiring used for grounding shall be insulated copper, unless otherwise noted. Size shall be in accordance with code for the application, minimum #12.

B. Where used in conjunction with computer equipment, grounding conductors shall be equal in size to the phase conductors.

C. Avoid splices in ground conductors.

2.2 RACEWAY

A. Grounding continuity shall be maintained for all metallic raceways.

B. Provide bonding jumpers across metal parts separated by non-conducting materials.

C. Where a grounding conductor is installed as a supplement to metallic raceway serving as the equipment grounding conductor, bonding conductor to the raceway at each end.

D. All raceway accessories, such as locknuts, bushings, expansion fittings, etc. shall be installed to provide maximum metal-to-metal bonding.

2.3 CLAMPS

A. Provide approved ground clamps for connecting grounding conductors to pipe, conduits, wireways, building steel, grounding rods, etc.

B. Where bond will be in an inaccessible location or as an alternate to ground clamps, provide exothermic weld, similar to Cadweld.

2.4 ACCESSORIES

A. Provide all necessary accessories of appropriate size and material for connection or termination of grounding conductors including:

1. Straps.
2. Clamps.
3. Lugs.
4. Bars and buses.
5. Isolators (where applicable).
6. Locknuts and bushings.

2.5 ACCEPTABLE MANUFACTURERS

A. Copperweld.

B. Cadweld (for exothermic welds).

C. O.Z. Gedney.

D. Burndy.

PART 3 - EXECUTION

3.1 SERVICE ENTRANCE/SWITCH

A. Coordinate all bonding and grounding requirements of the service entrance with the utility company.

B. Provide ground lug in each switchboard, minimum 25% of phase bus, along entire length of switchboard.

C. Separately connect each ground to existing grounding electrode. Test existing grounding electrode for proper resistance values and provide all necessary modifications required.

3.2 TRANSFORMERS

A. Bond each transformer secondary neutral to nearest building structural column or beam via transformer case grounding stud.

B. Provide jumper between transformer case and all conduit bushings.

C. Where a separate equipment-grounding conductor is provided the primary and/or secondary feeders; bond to transformer grounding stud.

D. Where isolation shield is provided, bond to transformer grounding stud.

E. Where a separate ground riser is provided in addition to or instead of building steel; bond transformer-grounding stud to the ground riser.

3.3 STRUCTURAL STEEL BUILDINGS

A. Select a column common to aligned electric closets as the bonding column for grounding of transformer neutrals, isolated grounds and separate equipment grounding conductors.

B. All grounding conductors in each closet shall be bonded in close proximity to one another.

C. Where a grounding conductor to be bonded is not in proximity to the common column, bond to the nearest column or structural beam.

D. Provide bonding jumper strap across all structural expansion joints where the grounding integrity of the structural system is reduced

3.4 RACEWAYS

A. Grounding continuity is to be maintained for all metallic raceways. Provide necessary clamps, bushings, straps and locknuts to assure continuity.

B. For non-metallic or flexible raceways, provide a separate equipment-grounding conductor bonded to both ends.

C. Where indicated, an additional equipment-grounding conductor shall be provided in metallic raceway.

D. Where indicated, an isolated ground conductor shall be provided in addition to the equipment-grounding conductor. Bond at each end to the isolated ground terminal identified.

3.5 EQUIPMENT

A. All equipment shall be grounded.

B. Where isolated grounding is indicated, it shall be for the isolation of internal equipment components only. All metallic enclosures of such equipment shall be connected to the equipment ground system.

3.6 PANELBOARDS

A. All panelboards and distribution panels shall be provided with a ground bar bonded to the enclosure. Provide an isolated ground bar connected to the incoming feeder ground where indicated.

3.7 TESTING

A. Upon completion of the installation, confirm the grounding continuity of all raceways, conductors and equipment. Maximum allowable resistance is 25 ohms.

3.8 RECORD DRAWINGS

A. Submit record As-Built Drawings indicating the location of all points where grounding conductors are bonded to steel, rods, plates, etc.

B. Indicate the location of all grounding buses not installed within distribution equipment.

END OF SECTION 260650

SECTION 260675 - HIGH PERFORMANCE K-7 DRY-TYPE TRANSFORMERS

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. Fabricate and test low voltage dry-type distribution transformers as described in this specification and on the Drawings.

1.2 SUMMARY

A. Transformers on this project significantly exceed basic DOE 2016 requirements being optimized to provide 33% energy savings on average compared to a comparable DOE 2016 transformer when feeding predominately electronic equipment in the 0-25% loading range.

B. General Purpose Transformers do NOT meet this specification as they do not carry a UL Listing for this application.

C. Other highlights of requirements of this specification include:

1. Copper wound
2. K-7 rated
3. No load loss limits
4. Efficiency under nonlinear loading to ensure real world performance
5. 105% continuous duty overload capacity
6. Performance Validation Reports for each unit shipped on project signed by professional engineer
7. Lockable Hinged Door to reduce arc flash risk when accessing for maintenance & thermal scans

D. Information to be submitted with bid:

1. Line-by-line compliance, deviation, exception for this specification
2. Performance Guarantee by Manufacturer that ALL transformers on this project will meet specified performance.
3. Failure to provide this information will result in a non-compliant proposal.

1.3 REFERENCES

A. US Department of Energy, 10 CFR Part 431 – Energy Efficiency Program for Certain Commercial and Industrial Equipment, Subpart K – Distribution Transformers

B. US Department of Energy, 10 CFR Part 429 – Certification, Compliance, and Enforcement for Consumer Products and Commercial and Industrial Equipment.

C. ANSI/NEMA ST 20 - 2014 - Dry Type Transformers for General Applications.

D. Metering Standards:

1. Computational algorithms per IEEE Std 1459-2000
2. UL 916, UL 61010C-1 CAT III

E. IEEE C57.110-2008 – IEEE Recommended Practice for establishing liquid-filled and dry-type power distribution transformer capability when feeding no sinusoidal load currents

F. IEEE Std C57.12.91-1995 Standard Test Code for Dry-Type Transformers

G. IEEE-1100 – Recommended Practice for Powering and Grounding Sensitive Electronic Equipment

H. LEED – Leadership in Energy and Environmental Design, U.S. Green Building Council.

I. Seismic Qualification References: International Building Code, 2006/2009 Edition, California Building Code, 2007/2010 Edition, ASCE Standard 7, 2005 Edition to OSHPD CAN 2-1708A.5, Rev. , ICC-ES AC 156, Effective 01/01/2007, OSHPD

J. ISO 9001:2008 – International Standards Organization - Quality Management System

K. ISO 14001:2004 – International Standards Organization - Environmental Management System

L. ISO 17025 – International Standards Organization - General requirements for the competence of testing and calibration laboratories

1.4 BID PROPOSAL

A. Compliance Review

1. Submit a complete copy of these specifications with each subparagraph marked either "compliance", "deviation", or "exception". Fully describe all deviations and exceptions taken to this specification.

   a. "Compliance": Comply with no exceptions.
   b. "Deviation": Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
   c. "Exception": Exception, do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives.

2. Unless a deviation or exception is specifically noted in the Compliance Review, it is assumed that the Bidder is in complete compliance with this Specification. Deviations or exceptions taken in cover letters, subsidiary documents, by omission or by contradiction do not release the Bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review. Bidders may submit the latest state-of-the-art components and their standard control components in lieu of the specified items. All deviations from the Specifications must be approved by the Architect/Engineer.

3. Failure to provide this information will result in a non-compliant proposal.

1.5 SUBMITTALS - Submit product data including the following:

A. Manufacturer documentation guaranteeing that ALL units on the project will comply with the performance requirements of this specification.

B. Where one or more of the integrated transformer options is selected for this project, provide associated documentation.

C. Insulation system impregnant data sheet as published by supplier.

D. Construction details including enclosure dimensions, kVA rating, primary & secondary nominal voltages, voltage taps, BIL, unit weight.

E. Basic Performance characteristics including insulation class, temperature rise, core and coil materials, impedances & audible noise level, unit weight.

F. Manufacturer documentation that sizing primary protection at 125% of nominal full load amps will not result in nuisance tripping on transformer inrush.

G. Documentation of UL listing of 2” clearance from ventilated surface

H. Inrush Current (typical 3 cycle recovery)

I. Short Circuit Current data: Primary & Secondary

J. Efficiency, Loss & Heat output Data

K. No load and full load losses per NEMA ST20

L. Linear load data @ 1/6 load

M. Linear load data @ 1/4, 1/2, 3/4 & full load

N. Linear Load efficiency @ 35% loading tested per NEMA TP-2.

O. Efficiency under K7 load profile at 16.7%, 25%, 50%, 75%, 100% of nameplate rating.

P. Factory ISO 9001 procedure describing nonlinear load test program.

1. Meter and CT details including model, accuracy, serial numbers and calibration information.

Q. 32 year Product and Performance Warranty Certificate

R. Manufacturer’s ISO 14001:2004 Certification

S. Manufacturer’s ISO 9001:2008 Certification

T. ISO 17025 Certificate - Efficiency Test Lab where transformers are tested.

U. Documentation that materials used for shipment packaging meet the environmental requirements of this specification.

V. For LEED projects, provide the following additional submittal information:

1. Optimize Energy Performance: Provide savings calculations vs. DOE 2016 baseline reference.

1.6 CLOSEOUT SUBMITTALS

A. Comprehensive Operations and Maintenance Manual

B. Applicable wiring diagrams, including any modifications made

C. Copies of completed factory and site testing reports.

1.7 NONLINEAR LOAD TEST PROGRAM

A. Efficiency shall be determined by actual measurements using a nonlinear load bank. Calculations based on software modeling is not acceptable.

B. Nonlinear Load Testing shall be carried out by an ISO 17025 Certified Efficiency Test Lab, and follow a defined protocol, independently audited within the manufacturer's certified ISO system.

C. Follow IEEE Std C57.12.91-1995 Standard Test Code for Dry-Type Transformers to determine efficiency. Proprietary or non-standard methodology is not acceptable.

D. The nonlinear load bank shall consist of phase-neutral loads, representative of a mix of electronic equipment.

E. Meters and CTs shall both be revenue class accurate and carry current calibration certificates. CTs shall be operated within their approved accuracy loading range. Dual meters shall gather simultaneous primary and secondary energy and harmonic data. Meter and CT details including model, accuracy, serial numbers and calibration information.

F. Efficiency: Measurements shall be taken at multiple load levels and plotted to show compliance with specification and correlation to the designed efficiency curve.

G. Harmonic data including current and Voltage THD at the different load levels shall be included with the test report.

1.8 PACKAGING FOR SHIPMENT

A. Transformers shall be packaged for shipment using materials that reduce environmental impact:

1. Transformer Wrapping

a. Transformers shall be wrapped for shipment in material that is recyclable or compostable at the destination

2. Transformer Shipping Base

a. Transformers shall be shipped on a base that uses at least 50% less wood than traditional pallets.
b. Wood used in the shipping base shall be Forestry Stewardship Council (FSC) certified as having been sustainably harvested.

3. Shall minimize labor, risk of injury and equipment damage, while handling from initial transportation through to final placement of the transformer.

1.9 DELIVERY, STORAGE AND HANDLING

A. Store and protect products

B. Store in a warm, dry location with uniform temperature. Cover ventilation openings to keep out dust, water, and other foreign material.

C. Handle transformers using lifting eyes and/or brackets provided for that purpose. Protect against unfavorable external environment such as rain and snow, during handling.

1.10 WARRANTY

A. Transformer shall carry a 32-year pro-rated warranty, which shall be standard for the product line.

B. Guaranteed Performance: Manufacturer warranty shall explicitly state that every transformer is guaranteed to meet published performance data.

C. Manufacturer warranty shall remain in effect through a qualified seismic event.

1.11 COMMERCIAL PRODUCT

A. Transformer shall be a standard item in the manufacturer’s catalog.

1.12 FACTORY WITNESS TESTING

A. At time of order, the customer may request that the project engineer or other designated customer representative witness the performance testing of one or more of the transformers on the project at the manufacturer’s facility, along with a demonstration of integrated metering option if specified.

1.13 PERFORMANCE VALIDATION REPORTS

A. A Performance Validation Report shall be provided for EACH transformer shipped on this project as follows:

1. Documentation shall be certified and signed by a (factory) professional engineer (PE), and identify each product by model and serial number.

2. Transformers shall be tested in an ISO 17025 Certified Test Lab.

3. Validation Report shall contain two components:

a. Test Report per DOE Test Method for Measuring the Energy Consumption of Distribution Transformers under Appendix A to Subpart K of 10 CFR part 431, identifying no load losses, and efficiency at 35% loading.
b. Routine Test Report per NEMA ST20 including audible noise test for each unit.

1.14 INTERNATIONAL STANDARDS ORGANIZATION REGISTRATION

A. Registration of the manufacturer to current versions of the following ISO standards is required.

1. ISO 9001:2008 – Quality Management System
2. ISO 14001:2004 – Environmental Management System

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/PRODUCT

A. Basis of Design: E-Saver-33L by Powersmiths International Corp. (contact Andy Topinka – andy@tgs-inc.com 862-210-8126

B. Manufacturers wishing to have products evaluated for acceptability and conformance with the performance requirements of this specification, shall provide detailed compliance and/or exception statements, along with the documentation required in the submittal section, including test documentation, signed by an engineer, that confirms that the transformer(s) meets the specified performance.

C. Failure to provide the required documentation no less than 7 days prior to the bid date will disqualify products from consideration for this project.

2.2 TRANSFORMER SPECIFICATION

A. Compatibility: This product must facilitate the ability of the electrical system to supply a sinusoidal voltage in order to improve the long-term compatibility of the electrical system with both linear and nonlinear loads.

B. 3-phase, common core, ventilated, dry-type, isolation transformer built to UL1561, NEMA ST20 and other relevant NEMA, UL and IEEE standards; 200% rated neutral; 60Hz rated; Transformers shall be UL or cUL Listed, and/or CSA Approved. All terminals, including those for changing taps, must be readily accessible by removing a front cover plate. Windings shall be continuous with terminations brazed or welded. 10kV BIL.

C. Lugs are not provided by the transformer manufacturer.

D. Winding Material: Copper

E. K-Rating: K-7 (per IEEE-C57.110)

F. Impedance: 4.0% or greater (unless otherwise noted) in order to manage downstream fault and arc flash levels, and required downstream component fault interrupting (kAIC) ratings.

G. Inrush: Inrush currents are managed in order to avoid nuisance tripping of the primary breaker and to enable the use of standard 125% rated primary protection, thereby avoiding expensive design changes that otherwise may be needed.

H. Operating Temperature Rise: 130 degree C in a 40 degree C maximum ambient.

I. Continuous Duty Overload Capacity: 105% of nominal kVA Rating.

J. Voltage Taps: For transformers 15kVA-750kVA, provide two 2-1/2% full capacity taps above and four 2-1/2% taps below nominal primary voltage.

K. Audible Noise levels:

1. Every unit to meet required noise level. Production Test every unit. Data to be available upon request.

2. Must meet 3 dB quieter than NEMA ST-20 as follows:

a. up to 50kVA: 42dB, 51-150kVA: 47dB, 151-300kVA: 52dB, 301-500kVA: 57dB, 501-700kVA: 59dB, 701-1000kVA: 61dB

L. Enclosure type: Ventilated NEMA 1 enclosure with Lockable Hinged Doors

1. Provide lockable hinged doors on the transformer to facilitate access in support of NFPA 70E/CSA-Z462 Arc Flash Standard to minimize arc flash risk when opening the enclosure of live equipment.

M. Rear Clearance: UL Listed for 2” clearance from the wall rather than standard 6”. This capability shall be explicitly described on the nameplate of each unit.

N. Exceed minimum efficiency requirements of US Department of Energy, 10 CFR Part 431 (DOE 2016), by complying with the table of Maximum No Load Losses, efficiency requirements at 1/6 load, efficiency at 35% load, and efficiency at 25% load under a K-7 load profile. Testing backed by ISO 17025 efficiency test lab.

kVA	Max. No load losses (Watts)	Efficiency @ 1/6 load (%)	Efficiency @ 35% load (%)	Efficiency at 25% load under K-7 nonlinear load
15	34	98.17	98.24	98.18
20	42	98.27	98.34	98.28
25	50	98.37	98.44	98.38
30	57	98.47	98.54	98.48
45	80	98.61	98.71	98.62
50	86	98.64	98.73	98.65
63	101	98.71	98.79	98.72
75	114	98.78	98.84	98.78
100	145	98.85	98.93	98.85
112.5	160	98.88	98.97	98.88
125	175	98.90	98.99	98.88
150	204	98.93	99.03	98.88
175	229	98.96	99.06	98.95
200	255	99.00	99.10	99.01
225	281	99.03	99.13	99.08
250	304	99.05	99.15	99.08
300	352	99.09	99.20	99.08
400	431	99.15	99.24	99.13
450	471	99.17	99.26	99.16
500	511	99.20	99.28	99.18
600	597	99.22	99.30	99.22
750	726	99.24	99.33	99.28

O. Maximum Allowable Footprint:

kVA	Standard Case Size (in)	Alternate Smaller Case Size (in)*
15	17.5W x 17D x 27.5H	17.5W x 14.5D x 25H
20	25.5W x 18D x 30H	23W x 15.5D x 27.5H
25	25.5W x 18D x 30H	23W x 15.5D x 27.5H
30	25.5W x 18D x 30H	23W x 15.5D x 27.5H
45	25.5W x 18D x 30H	25.5W x 16D x 29H
50	25.5W x 18D x 30H	No Alternate
63	31.5W x 21.5D x 40H	26.5H x 20D x 33H
75	31.5W x 21.5D x 40H	26.5H x 20D x 33H
100	31.5W x 21.5D x 40H	30.5H x 20D x 35H
112	31.5W x 21.5D x 40H	30.5H x 20D x 35H
125	37.5W x 26.5D x 48H	33W x 23D x 38H
150	37.5W x 26.5D x 48H	33W x 23D x 38H
175	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
200	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
225	37.5W x 31.5D x 52H	34.5W x 26.5D x 42H
250	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
300	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
400	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
450	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
500	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
600	64W x 47D x 67H	51.5W x 38D x 61H
750	64W x 47D x 67H	Contact Factory

P. Seismic Qualification: been seismically qualified in accordance with: International Building Code, 2006/2009 Edition, California Building Code, 2007/2010 Edition, ASCE Standard 7, 2005 Edition to OSHPD CAN 2-1708A.5, Rev. , ICC-ES AC 156, Effective 01/01/2007, OSHPD approved: OSP-0110-10.

a. Unit shall remain operational and shall not suffer electric or mechanical damage within the limits of a qualified seismic event
b. Certification Level: Short period spectral acceleration: SDS= 1.5 g, Seismic importance factor: Ip= 1.5, Installation height: z/h= 1.0, Installation restrictions: None - Valid for below grade, at grade and roof installations in floor mounted configuration.

Q. Insulation System:

1. Shall be NOMEX-based with an Epoxy Co-polymer impregnant for lowest environmental impact, long term reliability and long life expectancy
2. Class: 220 degrees C
3. Impregnant Properties for low emissions during manufacturing, highest reliability and life expectancy

4. Epoxy co-polymer
5. VOC: less than 1.65 lbs/gal (low emissions during manufacturing)
6. Water absorption (24hrs @25C): less than 0.05% (superior insulation, longer life)
7. Chemical Resistance: Must have documented excellent performance rating by supplier.
8. Dielectric Strength: minimum of 3200 volts/mil dry (for superior stress, overvoltage tolerance)
9. Dissipation Factor: max. 0.02 @25C to reduce aging of insulation, extending useful life.

R. TRANSFORMER OPTIONS TO BE INCLUDED ON THIS PROJECT

a. Enclosure Options: NEMA 3R, indoor sprinklerproof, outdoor padmount, outdoor secure space, outdoor public space, totally enclosed, stainless steel.

b. Integrated long term Power & Energy Logger

i. Supports NFPA 70E/CSA-Z462 Arc Flash Standard to provide operating data without opening transformer enclosure
ii. Basis of design: Equivalent or superior to Powersmiths Express Logger.
iii. Meter shall be factory-installed inside the transformer, connected to the transformer secondary, complete with fused voltage connections, revenue class 0.5 or better CTs
iv. Access for meter setup, real time data viewing, event log, and downloading of logged data is via an integrated USB access port on the enclosure of the transformer.
v. Parameters measured include: V, I, PF, Hz, kW, kVA, kVAR, kWh, Ad, KWd, kVAd, kVARd, temperature, including the option to log min, max, average or instantaneous values of any of the parameters.
vi. The meter shall log real-time data at user selected intervals, as well as an event log when measured values have exceeded user defined thresholds.
vii. The logger shall be able to store a year of monthly peak demands.
viii. The logger shall be able to log up any 2 selected data points for over 10 years, more data points for shorter period.

c. Integrated load-side Revenue Grade Power & Energy Meter with communications options

i. Supports NFPA 70E/CSA-Z462 Arc Flash Standard to provide operating data without opening transformer enclosure
ii. Meter shall be factory-installed on the transformer, connected to the transformer secondary, complete with fused voltage connections, revenue class 0.3 CTs individually characterized to 0.1% and CT shunting block
iii. Provide local display of real time energy and power quality information as it relates to the load fed from the transformer.
iv. Parameters measured include: V, I, THD (V, I), PF, Hz, kW, kVA, kVAR, kWh, Ad, KWd, kVAd, kVARd
v. Communications: Modbus (serial over RS-232)

1. Supply integrated meter having features described above (Basis of Design: Powersmiths SMART 2A)

2. Supply integrated meter having features described above, plus access ports having 600V safety class twistlock connectors for quick and safe access to transformer primary and secondary voltages and currents with revenue 0.3 class accuracy. CTs shall be provided with error correction characterization. Accurate and dynamic temperature data shall be provided via thermistors located in each leg of the transformer, accessible by twistlock connector. (Basis of Design: Powersmiths SMART 2B)

d. Integrated Input and/or Output Breakers

i. General Requirements

1. Transformer integrated breaker assembly(ies) shall be separately enclosed from the main transformer coil & coil compartment, and the whole assembly shall remain rigid even with the transformer compartment covers removed.

2. The enclosure rating shall be meet or exceed the requirements for the transformer.

3. The breaker compartment(s) shall have provision for conduit access from the rear, bottom or side, and shall be front or top accessible for installation and service.

4. Each breaker shall be pre-wired to its respective transformer connection.

5. The transformer/breaker assembly shall carry as a minimum a field inspection certificate from a recognized agency assuring compliance to appropriate electrical codes.

ii. Input Breaker

1. The transformer shall be equipped with an integrated input breaker assembly.

2. The breaker shall have an overcurrent protection rating of 125% of transformer's nominal input full load current satisfying both US National Electrical Code and Canadian Electrical Code requirements. The breaker shall be rated for inrush current of a minimum of 10 times its nominal overcurrent rating.

3. The minimum breaker kAIC rating shall be determined by specifying engineer, as it depends on the service to which the assembly is connected.

iii. Single Output Breaker

1. The transformer shall be equipped with an integrated output breaker assembly.

2. The breaker shall have an overcurrent protection rating of 125% of transformer's nominal input full load current satisfying both US National Electrical Code and Canadian Electrical Code requirements. The breaker shall be rated for inrush current of a minimum of 8 times its nominal overcurrent rating.

3. The minimum breaker kAIC rating shall be sized appropriately for the available short circuit currrent of the transformer to which it is connected.

iv. Dual Output Breakers

1. The transformer shall be equipped with two integrated output breaker assemblies.

2. Each breaker shall have an overcurrent protection rating of up to 125% of transformer's nominal input full load current, or as specified by the specifying engineer, and satisfying both US National Electrical Code and Canadian Electrical Code requirements.

3. Each breaker shall be rated for inrush current of a minimum of 8 times its nominal overcurrent rating.

4. The minimum breaker kAIC rating shall be sized appropriately for the available short circuit currrent of the transformer to which it is connected.

e. Integrated Access Port to Transformer Output Voltages and Currents to enable spot checks of load profile measurement without opening transformer enclosure.

i. Supports NFPA 70E/CSA-Z462 Arc Flash Standard to provide operating data without opening transformer enclosure.

ii. Supply access to transformer output voltages and currents without opening the enclosure, via twistlock connectors, in support of NFPA 70E/CSA-Z462 Arc Flash Standard to avoid arc flash risk as associated with opening the enclosure of live equipment.

iii. Currents shall be accessed via integrated FTRZ listed 333mV CTs.

f. Integrated Rotatable Infrared (IR) Viewing Port to address NFPA 70E/CSA-Z462 Arc Flash Standard

i. Provide integrated rotatable IR viewing port that provides single point viewing point that enables the thermal scanning of all live connections including primary and secondary feeder terminations and taps without requiring opening of the transformer enclosure or exposure to live parts.

ii. The port shall be easily usable with a wide variety of makes and models of commercially available thermal scanning devices, without requiring any proprietary connectors, adapters or other components.

iii. Basis of performance: Powersmiths Rotatable IR Viewing Port.

iv. For the installation of one or more fixed IR windows to be considered an acceptable alternative on this project, the transformer manufacturer shall provide detailed drawings prepared by a qualified engineer detailing how all live terminals will be viewable. The manufacturer shall commit that should all terminals not be viewable once installed, the manufacturer shall rectify the situation at his own expense.

g. Lug Kit: Supply with standard screw-type lugs as specified at time of order.

h. Lug Kit: supply with Compression lugs configured as specified at time of order.

i. Electrostatic Shield: Each winding is independently single shielded with a full-width copper electrostatic shield [Double shields or triple shields may also be specified]

j. TVSS: UL 1449 listed, with EMI/RFI Filtering. Rating: 80kA/mode [optional 120kA/mode, 160kA/mode]

k. Low Inrush: less than 6 times primary full load current with a 3% source impedance.

l. Enhanced Seismic Bracing: increases withstand to Short period spectral acceleration: SDS= 2.28 g.

m. Wall Brackets are available for transformers up to 75kVA where specified.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow all national, state and local codes with respect to transformer installation.

B. Where sound level may be of concern, utilize the services of a recognized and established Acoustical Consultant to provide the proper installation environment to minimize noise and vibration.

C. Check for damage and loose connections.

D. Set the transformer plumb and level.

E. Mount transformer on vibration isolation pads suitable for isolating the transformer.

F. Provide Seismic restraints where required.

G. Coordinate all work in this Section with that in other sections.

H. Verify all dimensions in the field.

I. Adjust transformer secondary voltages to provide the required voltage at the loads.

J. Upon completion of the installation, an infrared scan shall be provided for all bolted connections. Correct any deficiencies. Repeat thermal scan 3 months after installation and prepare a report for the customer.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and review test results.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in

2. Follow NETA Acceptance Testing Specification.

3. Certify compliance with tests.

3.3 PERFORMANCE VALIDATION

A. To insure that the products shipped to the job site meet this specification, provide on-site revenue class accurate efficiency and harmonic measurements of transformers once installed and operating at customer's site. Data shall be collected from primary and secondary sides of the transformer simultaneously on a synchronized cycle by cycle basis. The use of two discrete meters that are not synchronized is not acceptable. Sampling shall be of 10% of transformers on the project once installed and operating, as selected by customer. Submit a detailed report to the project engineer.

B. Where integrated metering has been specified to be connected to an external network, contractor to provide the required connection and commissioning to customer's specified system.

C. Identify non-compliant products to the engineer and replace at no cost to the customer.

END OF SECTION 260675

SECTION 260700 - PANELBOARDS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install the panelboards and to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

A. Grounding

B. Overcurrent Protection

1.3 SUBMITTALS

A. Submit shop drawings for equipment and component devices under provisions of Division 1.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

C. Furnish two (2) sets of keys to Owner.

1.4 REFERENCES

A. FS W-C-375 - Circuit breakers, molded case, branch circuit and service.

B. FS W-P-115 - Power distribution panel.

C. NEMA AB 1 - Molded case circuit breakers.

D. NEMA KS 1 - Enclosed switches.

E. NEMA PB 1 - Panelboards.

F. NEMA PB 1.1 - Instruction for safe installation, operation and maintenance of panelboard rated 600 volts or less.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - PANELBOARD AND LOAD CENTERS

A. Siemens.

B. Square "D".

C. General Electric.

D. Or approved equal.

2.2 BRANCH CIRCUIT PANELBOARDS

A. Lighting and appliance branch circuit panelboards: NEMA PB 1; circuit breaker type.

B. Enclosure: NEMA PB 1; Type 1.

C. Cabinet size: Approximately 6 inches deep; 20 inches wide for 240 volt and less panelboards. Verity field conditions and alter dimensions to suit at no additional cost.

D. Provide surface cabinet front door-in-door with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

E. Provide panelboards with copper bus, rating as scheduled on Drawings. Provide copper ground bus in all panelboards and isolated ground bus in those as indicated on Drawings.

F. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt rated for 125 amps or less, 22,000 amperes rms symmetrical for 240 volt rated greater than 125 amps to 225 amps and 30,000 amperes for emergency power panelboards (verify in field). If panelboard is noted as a main distribution panelboard, than panel shall be rated as a distribution panelboard. Contractor shall provide short circuit study to ensure adequacy.

G. Molded case circuit breakers: Bolt-on type thermal magnetic trip handle for all poles. Provide circuit breakers UL listed as type SWD for lighting circuits. Breaker handle to indicate ampere rating.

2.3 DISTRIBUTION PANELBOARDS

A. Description: NEMA PB 1, circuit breaker type. The bus of all panels rated a minimum 400 amps shall be distribution type.

B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.

C. Minimum integrated short circuit rating: 65,000 amperes rms symmetrical for 240 volt panelboards; 65,000 amperes rms symmetrical for 480 volt panelboards, unless otherwise noted on Drawings.

D. Model Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR as specified on Drawings.

E. Enclosure: NEMA PB 1, Type 1.

F. Cabinet Front: Surface type, fastened with screws. Double hinged doors with flush lock, metal directory frame, finished in manufacturer's standard gray enamel. One hinged door to access breakers, the other to access wiring compartment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards flush or surface mounted as indicated on Drawings.

B. Mounting height maximum 6 ft. (2 m) to top circuit breaker.

C. Provide filler plates for unused spaces in panelboards.

D. Provide type written circuit directory for each branch circuit panelboard. Indicate loads served and panel name by matching that shown on panel schedules on Drawings. Revise directory to reflect circuiting changes required to balance phase loads. Provide a second copy and turn over to Owner.

E. Provide 3/4" thick plywood backboard for mounting of panels. Paint backboard with fire retardant paint.

F. Provide nameplates as indicated in Section 16550.

3.2 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and mechanical inspection: Inspect for physical damage, proper alignment, anchorage and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches and fuses.

C. Provide thermographic inspections in accordance with Section 26 0100.

3.3 TESTS

A. Submit certification that each panelboard has withstood, without breakdown, a factory dielectric (Hi-Pot) test consisting of a one minute application of a 60 cycle AC test voltage applied between phase legs and from each phase leg to enclosure.

B. The applied test voltage shall have an RMS value of at least twice the line to line system voltage to which the panelboard is to be applied, plus one thousand volts (minimum 1500V).

3.4 RECORD DRAWINGS

A. Submit As-Built Drawings indicating the location of all panelboards.

END OF SECTION 260700

SECTION 260800 - FIRE ALARM SYSTEM

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 FIRE ALARM SYSTEM

A. The existing fire alarm system is an addressable system. The fire alarm control panel is located in the boiler room.

B. Add and modify as required to the existing system, as specified/shown on the drawings and as per field requirements. All devices shall be suitable for operation and compatible with existing system. Provide relays modules, cards, power supplies, etc. as required.

C. Provide sufficient quantity of relays for fan shutdown as specified/shown on Drawings.

D. Connect, test and leave the system in first class operating condition.

E. The system shall maintain all applicable Local, State and National Codes including the National Electrical Code, NPFA-72, NFPA-101, ADA 1971 and NEC. The system shall be listed by Underwriter's Laboratories, Inc.

F. The Electrical Contractor shall provide a manufacturers certified technician to supervise installation, adjustments, final connection and system testing.

G. Fire alarm wiring and cable shall be per manufacturer's requirements.

H. Fire alarm system test shall be in accordance with NFPA-72 and local fire department requirements.

END OF SECTION 260800

SECTION 260900 - GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GUARANTEE

A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with the guarantee provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace, and/or repair any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION 260900

SECTION 311750 - EROSION AND SEDIMENT CONTROL

PART 1- GENERAL

1.1. GENERAL REQUIREMENTS:

Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2. DESCRIPTION OF WORK:

Provide all means necessary to install, inspect and maintain, and remove temporary erosion and sediment control measures as shown on the drawings and as required to minimize the erosion and unspecified transport of soil and sediment from the site.

1.3. QUALITY ASSURANCE:

A. General

1. Install all erosion and sediment controls in accordance with the drawings and/or the latest edition of the *New York State Standards and Specifications For Erosion And Sediment Control, November 2016* (N.Y.S. Guidelines).

2. Grade and maintain site at all times such that all storm water runoff from disturbed areas is diverted to soil erosion and sedimentation control facilities.

3. No changes to the Soil Erosion and Sedimentation Control Plan shall be made without approval of the Owner's Representative and the Engineer.

4. No soil, not protected by erosion and sedimentation control measures, can be disturbed at any time.

5. The Contractor shall comply with applicable Federal, State, and local regulations relating to the prevention and abatement of pollution.

6. The Contractor shall be responsible for maintaining all erosion and sediment control devices and shall be required to provide measures to correct problems encountered in the field whether or not the measures are shown on the plan. Measures that include the installation of additional sediment traps, erosion control blankets or reducing the amount of exposed soil may be necessary to comply with Part 700 etseq of Title 6, Chapter X of NYCRR

B. Product Data: Submit manufacturer's catalogue cuts, specifications and installation instructions for silt fences, filter fabrics and erosion control blankets.

C. Product Stockpiling: Stockpiles of stabilization measures such as haybales, silt fence, 1-1/2” gravel for check dams, filter fabric, and mulch shall be maintained at the site for use in stabilizing disturbed areas in advance of severe weather conditions.

PART 2 - PRODUCTS

2.01 Inlet Protection: Filtrexx inlet protection or approved equal.

2.02 Dewatering Pits: Number and location to be determined by contractor.

2.03 Silt Fence: Silt fence fabric shall be Mirafi 100X or equal. Wood posts shall be of sound quality hardwood, a minimum 36 inches long and two inches square. Metal posts shall be standard T and U section weighing not less than one pound per linear foot. Wire fence backing shall be a minimum 14-1/2 gage with a maximum six-inch mesh opening and securely attached to fence posts. Posts shall extend a minimum of 16 inches into the ground.

2.04 Hay Bale Barriers: Wood posts shall be of sound quality hardwood, a minimum 36 inches long. Metal posts shall be standard T and U section weighing not less than one pound per linear foot.

2.05 Filter Fabric: Filter fabric shall be Mirafi 600x.

2.06 Temporary Stabilization

A. Establishment of Temporary Grass Cover: Prepare seed bed, scarify if compacted, remove debris and obstacles such as rocks and stumps, and seed within 24 hours. Amend soil, lime soil to pH of 6.0 and fertilize at a rate of 14 lbs. per 1,000 square feet with a 5-10-10 or equivalent fertilizer. Work amendments a minimum of 4 inches into soil. If seeding in October/November seed shall be Certified Aroostook winter rye @ 100 lbs. per acre, otherwise seed shall be ryegrass (annual or perennial) @ 30 lbs. per acre.

B. Mulch/RECP: Small grain straw mulch or Type 1 erosion control blankets as specified on drawing SP-5.1. Straw mulch shall be applied at a rate of two tons (100 to 120 bales) per acre. Erosion control blankets shall be BonTerra S2 installed as recommended by manufacturer.

C. Treat all disturbed areas within 500 feet of an inhabited structure as necessary to provide dust control. Conform to all local and state regulations governing these activities.

D. Install Temporary Stabilization within twenty-four (24) hours after the end of construction activities in an area unless there is snow cover or construction activities will resume within seven (7) days.

E. Tackifier: When covering between October and April, cover exposed soils with hydroseed and tackifier with the following application rates:

1. Slopes less than 3 Vert.:12 Horiz. 75 lbs/ac
2. Slopes between 3 Vert.:1 Horiz. and 2 Vert.:1 Horiz. 100 lbs/ac
3. Slopes greater than 2 Vert.:1 Horiz. 150 lbs/ac

Acceptable product: Conwed Fibers Con-Tack AT Tackifier as manufactured by Profile Products, LLC (800) 366-1180

PART 3 - EXECUTION

3.01 General: Install and remove measures as required. The measures shall be maintained until permanent protection of the contributing watershed is approved by the Owner's Representative. All storm drainage outlets that have been silted due to the work will be cleaned, as required.

3.02 Inspections: Inspect measures daily and within 24 hours of the end of a 0.5 inch or greater storm event. All inspections are to be made by a NYS trained and certified contractor. Stabilized areas will be inspected monthly until the entire site is stabilized. Maintain SWPPP log book on-site with daily reports for the Owner demonstrating compliance with these specifications and the project’s SWPPP.

3.03 Maintenance: Maintenance will be completed within seven (7) calendar days of determining its need.

3.04 Pavement: Provide temporary pavement when adjacent to traffic lanes and when directed by the Engineer.

3.05 Vehicle Washdown: Provide vehicle washdown area to prevent tracking of soil and other debris onto adjoining public and private roads. Maintain as necessary during project earthwork operations.

END OF SECTION 311750

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including applicable portions of Division 1 – General Requirements of the Specifications apply to this Section.

B. Related Division 2 specification sections include:
   1. Section 311750 Erosion and Sediment Control

1.2 SUMMARY

A. Section Includes:
   1. Definition of excavation, fill and backfill materials.
   2. The preparation and dewatering requirements for open excavations and/or structures.
   3. General excavation requirements.
   4. Excavation requirements for buildings and structures.
   5. Excavation requirements for foundations.
   6. Excavation requirements for preparing subgrades for walks and pavements.
   7. Excavation requirements for utility trenches.
   8. Excavation of landscaped areas.
   9. Subgrade inspection requirements.
   10. General backfill requirements.
   11. Backfill requirements for utility trenches.
   12. Fill material requirements.
   13. Soil moisture control requirements.
   14. Compaction requirements of backfills and fill material.
   15. Excavation and compaction of stormwater systems.
   16. Bedding course placement under slabs-on-grade, walks and other structures.
   17. Subbase course placement under asphaltic concrete pavements.
   18. Drainage course for porous pavement and underdrain systems.
   19. Subsurface drainage.
   20. Field quality control of subgrade preparation, material backfill and compaction testing.
   21. Protection of excavated and graded areas.
   22. Storage of soil materials.
   23. Unauthorized excavation.
   24. Removal of excess and unsuitable material from the site.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beneath, 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 to the top of the proposed subgrade as shown and detailed on the plans.

B. Structural Fill: Fill material placed under structures after removal of unsuitable bearing materials. Material shall be 3/4 inch, clean aggregate or other material as approved by the project's geotechnical engineer.

C. Subbase Course: Aggregate layer placed between the existing subgrade and hot-mix asphalt paving.

D. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe and in other open excavated areas to support new curbing, walks, concrete stairs, slabs-on-grade, concrete headwalls, manholes or other structures. The bedding material shall also be used to backfill trenches to the depths and/or limits detailed on the plans. Sand bedding material shall be used in place of the aggregate material specified where required by either the local utility, Owner's representative or Project Engineer.

E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill, or soil from on-site sources meeting the specifications for fill material and determined suitable for on-site use by the Project's geotechnical engineer.

F. Drainage and/or Reservoir Course: Aggregate layer supporting the collection and transporting of water.

G. Earth Excavation: Defined to include removal, and if required proper disposal off-site, of the following:

1. Soil and all other materials encountered of any name and nature that are not classified as rock excavation or unauthorized excavation.
2. Hardpan, loose or decomposed bedrock or other such material that may require intermittent drilling and wedging to increase production or facilitate handling of the material with equipment normally used in the particular excavation operation

H. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Geotechnical Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions.

I. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

J. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner, Construction Manager, or Engineer.

Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation. Remedial work may include, but not be limited to, replacement of the unauthorized excavation by backfilling and compacting as specified for authorized excavations of the same classification, unless otherwise directed by the Project's Geo-Technical Engineer. In areas of footings and foundations to structures, remedial work may include replacement of unauthorized excavation material with lean concrete subject to approval by the Project's Geo-technical Engineer.

K. Fill: Soil materials used to raise existing grades.

L. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted.

M. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, inlets, catch basins, manholes, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

N. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below the subbase or bedding course, drainage or reservoir course, or topsoil materials.

O. Recycled Material: Any form of recycled or reused granular material, except on-site processed rock. All such material will require the approval of the project's geotechnical engineer. The use of recycled material from any off-site source will not be permitted.

P. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Geofoam.
4. Warning tapes.
5. Imported fill and aggregate

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Warning Tape: 12 inches long; of each color.

C. Qualification Data: For qualified testing agency.

D. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.

E. Pre-Excavation 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.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining campus roads, streets, walks, and other adjacent occupied or used campus 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. Utility Locator Service: Notify "Call Before You Dig" for area where Project is located before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures are in place.

D. Do not commence earth moving operations until plant-protection measures are in place.

E. The following practices are prohibited within areas not identified as work zones shown on the approved Construction Phasing Plan:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Erection of sheds or structures.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Subsurface Information:

1. The Owner makes no predictions or representations regarding the character or extent of soil, rock or other subsurface condition to be encountered during the work. The Contractor shall make his own deductions on the subsurface conditions which may affect the methods or cost of construction of the work hereunder, and he agrees that he will make no claims for damages or compensations, except as are provided under the agreement, should he find conditions during the progress of the work different from those as calculated and/or anticipated by him. Additional borings and other exploratory operations may be performed by the Contractor, at the Contractor's option and following the Owner's approval. No change in the Contract Sum will be authorized for such additional exploration undertaken by the Contractor.

2. The Contractor shall make his own deductions of the subsurface conditions which may affect the methods or cost of construction of the work hereunder, and he agrees that he will make no claims for damages or compensations resulting from the subsurface conditions.

3. The Contractor, by careful examination, shall inform himself as to the nature and location of the work; the confirmation of the ground, the nature of the subsurface conditions; the locations of the groundwater table; the character, quality and quantity of the materials to be encountered; the character of the equipment and facilities needed preliminary to and during the execution of the work; the general and local conditions, water levels and all other matters which can in any way affect the work.

4. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining properties and the proposed sequence of construction.

5. The Contractor shall investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions and other limitations affecting transportation to, ingress and egress of the site of the work. The Contractor shall conform to all New York State and Federal regulations in regard to the transportation of materials to and from and at the job site and shall secure in advance such permits as may be required.

PART 2 - PRODUCTS

2.1 SOIL 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, and SP 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 SM, 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.
2. Unsatisfactory materials also include materials below structures and/or foundations determined by the Geotechnical Engineer to be unsatisfactory bearing materials.

D. Subbase Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; NYSDOT Type 1 Subbase Course, Item 304.11. Recycled material (building and road demolition material and recycled material consisting of brick, cement concrete, or other materials) may not be used without written authorization from the owner.

E. Structural Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve. This material must be approved by the project's Geotechnical Engineer.

F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel or crushed stone; ASTM D 2940; except with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 8 sieve.

G. Drainage and/or Reservoir Course: For use in porous pavement, rain gardens and underdrain systems. Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading AASHTO Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

H. Trap Rock: Narrowly graded mixture of washed crushed stone ASTM D 448; coarse-aggregate grading Size 1; with 100 percent passing a 4-inch sieve and 0 to 15 percent passing a 1-1/2-inch sieve.

I. Sand: ASTM C 33; fine aggregate.

J. Topsoil and other Planting Media: See Division 32 Section 329000 Planting Media Preparation And Placement.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Filter fabric, manufactured for subsurface drainage applications, should meet the following minimum requirements as described in the "Subsurface Investigation and Analysis Report":

1. Minimum Permittivity (ASTM D4991) = 0.2 sec^{-1}

2. Maximum AOS (ASTM D4751) = 0.25 mm

B. Acceptable Products:

1. 1020 by Advanced Drainage System, Inc.
2. 4545 by Amoco Fabrics
3. FX-100HS by Carthage Mills
4. C-120NW by Contech Construction Products, Inc.
6. Mirafi 140N by Mirafi, Inc.
8. Terra Tex N04 by Webtec, Inc.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

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 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. 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.

1. 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 or unauthorized excavation.

    a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

2. Rock excavation includes removal and disposal of rock if material cannot be reused on-site or found to be surplus excavated material. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. Twenty-four (24) inches outside of concrete forms other than at footings.
    b. Twelve (12) inches outside of concrete forms at footings.
    c. Six (6) inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. Six (6) inches beneath bottom of concrete slabs-on-grade.
    f. Six (6) inches beneath pipe in trenches, and the greater of twenty-four (24) inches wider than pipe or thirty (30) inches wide.

3.4 EXCAVATION FOR BUILDINGS AND STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus one (1) inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
    1. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus one (1) inch. Do not disturb bottom of excavations intended as bearing surfaces.
    2. Excavation for removal of unsuitable bearing materials below structure footings. Excavate unsuitable bearing materials as directed by the Geotechnical Engineer.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Division 31, Section 311250 Tree Protection and Pruning.

3.5 EXCAVATION FOR FOUNDATIONS

A. Excavate surfaces under footings and slabs to indicated gradient, lines, cross sections and elevations.

B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

C. Excavate to provide the following clearance on each side of the proposed footing or column.
1. Twenty-four (24) inches outside of concrete forms other than at footings.
2. Twelve (12) inches outside of concrete forms at footings.
3. Six (6) inches beneath bottom of concrete slabs-on-grade.

D. Excavate to remove unsuitable bearing materials below structure footings. Excavate unsuitable bearing materials as directed by the Geotechnical Engineer.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 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.

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 twelve (12) inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: Twelve (12) inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches six (6) inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

3.8 EXCAVATION OF AREAS TO BE LANDSCAPED

A. Excavate existing soil to the depths required to prepare the subgrade to receive topsoil, amended soil, drainage course material or other material as detailed on the plans. Loosen subgrade using rototillers to a minimum depth of six (6) inches. Remove all stones larger than 1-inch in any dimension and all sticks, roots, rubbish, and other extraneous matter within the planted areas and legally dispose of them off the Owner's property.

B. If underground utilities, rock or groundwater conditions are encountered at an elevation at or above the elevation of the required subgrade the Contractor shall notify the owner's representative, the Engineer and the Landscape Architect immediately.

C. For the special excavation (and compaction) requirements for construction of the bioretention filter areas and rain gardens refer to Section 3.15 of these specifications.

3.9 SUBGRADE INSPECTION

A. Notify the Geotechnical Engineer when excavations have reached required subgrade.

B. If the Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with structural fill or other backfill 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 Architect, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 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.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape 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 backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, 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 backfill of satisfactory soil to final subgrade elevation.

F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 FILL MATERIAL

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 follows:

1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use structural fill.
4. Under building slabs, use structural fill.
5. Under footings and foundations, use structural fill.
6. For fill in stormwater bioretention filter areas refer to Subsection 3.15 of this specification.

C. Place fill on subgrades free of mud, frost, snow, or ice.

3.13 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.

3.14 COMPACTION OF BACKFILLS AND FILL MATERIAL

A. Place backfill and fill materials in layers not more than nine (9) inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top twelve (12) inches of existing subgrade and each layer of backfill or fill material at ninety-five (95) percent.
2. Under walkways, scarify and recompact top six (6) inches below subgrade and compact each layer of backfill or fill material at ninety-five (95) percent.
3. Under turf or unpaved areas, scarify and recompact top six (6) inches below subgrade and compact each layer of backfill or fill material at ninety (90) percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at ninety (90) percent.
5. For special compaction requirements of fill material in the stormwater bioretention filter areas and rain garden areas refer to Subsection 3.15 of this specification.

3.15 EXCAVATION AND COMPACTION OF STORMWATER BIORETENTION FILTERS AND RAIN GARDENS

A. It is very important to minimize compaction of both the existing subgrade and any required fill placement within the bioretention filter areas and rain garden areas. When possible, use excavation hoes to remove original soil. If bioretention areas and rain garden areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and storage volumes and is not acceptable. Compaction will significantly contribute to design failure.

B. Compaction can be alleviated within the existing subgrade of the bioretention area or rain garden area by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the compaction zone. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

C. When either fill placement or backfilling of over excavated material within bioretention filter areas or rain garden area is necessary, place soil in twelve inch (12”) lifts or greater. Do not use heavy equipment within the bioretention filter area or rain garden area. Heavy equipment may be used around the perimeter of the bioretention filter area or rain garden area to supply planting soil and other material. Grade bioretention and rain garden material by hand or with light equipment such as a compact loader or dozer/loader with marsh tracks.

D. The bioretention filter areas and rain garden areas may not be constructed until all contributing drainage area has been stabilized.

3.16 SUBBASE COURSE UNDER ASPHALTIC CONCRETE PAVEMENTS

A. Place subbase course on existing and/or compacted subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements as follows:

1. Place subbase course material over subgrade and under hot-mix asphalt pavement.
2. Shape subbase course to required crown elevations and cross-slope grades.
3. Place subbase course six (6) inches or less in compacted thickness in a single layer.
4. Place subbase course that exceeds six (6) inches in compacted thickness in layers of equal thickness, with no compacted layer more than six (6) inches thick or less than three (3) inches thick.
5. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than ninety-five (95) percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders, at least 36 inches wide, of satisfactory soil materials and compact simultaneously with each subbase course layer to not less than ninety-five (95) percent of maximum dry unit weight according to ASTM D 1557.

3.17 BEDDING COURSE UNDER SLABS-ON-GRADE, WALKS AND MISC. STRUCTURES

A. Place bedding course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact bedding course under slabs-on-grade, walks and other structures as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place bedding course six (6) inches or less in compacted thickness in a single layer.
3. Place bedding course that exceeds six (6) inches in compacted thickness in layers of equal thickness, with no compacted layer more than six (6) inches thick or less than three (3) inches thick.
4. Compact each layer of bedding course to required cross sections and thicknesses to not less than ninety-five (95) percent of maximum dry unit weight according to ASTM D 698.

3.18 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile, drainage course filter material and subdrainage pipe in accordance with the details shown on the plans.

1. Surround drain pipe with six inches (6”) minimum drainage course material (as specified herein) or as detailed on plans.
2. Refer also to Division 33, Section 334600 Subdrainage of these specifications.

3.19 FIELD QUALITY CONTROL

A. Special Inspections: engage a qualified special inspector to 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: engage a qualified geotechnical engineering testing agency to perform tests and inspections. Testing Agency to be approved by the owner prior to being retained.

C. 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. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. The location of each compaction test shall be recorded on a site plan and labeled in the same manner as the corresponding test report. Upon completion of the project all test reports and location maps shall be submitted to the owner. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every fifty (50) feet or less of wall length, but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one (1) test for every one hundred and fifty (150) feet or less of trench length, but no fewer than two (2) tests.
4. Compaction tests of the base material shall be completed such that no precipitation occurs between the compaction test and the paving.

F. 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.

G. Soil Material Testing: A representative sample from each truck load of imported material shall be tested for conformance to the specifications.

H. Import Material that does not meet the specified gradation shall be removed from the site and replaced with conforming material.

3.20 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. Turf Areas, Planting Areas or other Unpaved Areas: Plus or minus one (1) inch of the proposed top of subgrade elevation to receive topsoil, planting and/or amended soil mix, drainage course material or other material to the depths detailed on the plans.
2. Concrete Pavements, Walks and other structures: Plus or minus 1/2 inch of the proposed bottom of the bedding course as detailed on the plans.
3. Asphalt Pavements: Plus or minus 1/2 inch of the proposed bottom of the subbase course as detailed on the plans.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.21 PROTECTION OF THE WORK AREAS

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 Architect; 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.

3.22 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.

3.23 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 3500 psi, may be used when approved by either the Architect, Geotechnical Engineer, or Structural Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.24 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Unless directed otherwise, transport surplus satisfactory and unsatisfactory soil off Owner’s property.

1. Remove waste materials, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including applicable portions of Division 1 – General Requirements of the Specifications apply to this Section.

B. Related Division 2 specification sections include:

1. Section 010100 Supplementary General Requirements
2. Section 312000 Earthwork

C. Reference herein to NYSDOT standard specifications shall mean applicable sections of the New York State Department of Transportation, Office of Engineering, Standard Specifications, Construction and Materials, dated January 1, 2022 and the latest addendum thereto.

1.2 SUMMARY

A. Section Includes:

1. New and/or replacement hot-mix asphaltic concrete paving.
2. Hot-mix asphaltic concrete paving overlay.
3. Hot-mix asphalt patching of existing pavement.
4. Porous Pavement.

1.3 DEFINITION

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: For each job mix proposed for the Work.

B. Material Certificates: For each paving material, from manufacturer.

C. Material Test Reports: For each paving material.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NYSDOT for asphalt paving work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
4. Asphaltic Concrete Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Concrete Top Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 64-22.

B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.

C. Prime Coat: Asphalt emulsion prime coat complying with NYSDOT requirements.

D. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

E. Water: Potable.

F. Undersealing Asphalt: ASTM D 3141, pumping consistency.

2.3 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Asphaltic Concrete Top Course: NYSDOT Item 403.16.
3. Asphaltic Concrete Base Course: NYSDOT Item 403.12.

B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment 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. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the Owner’s representative, and replace with compacted backfill or fill as directed by the Architect or Engineer.

C. Proceed with paving only after unsatisfactory conditions have been corrected and approved by the Owner’s representative.

D. Verify that utilities and other items requiring a cut and installation beneath the asphalt surface have been completed prior to placement of either the new asphaltic concrete top course or asphaltic concrete overlay.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. 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. (0.2 to 0.7 L/sq. m).

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.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. 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 asphaltic concrete top course material to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

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. Use hot-applied joint sealant to seal cracks and joints more 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. Ensure that prepared subgrade is ready to receive paving.

B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

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.

3.5 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphaltic concrete base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphaltic concrete top course in single lift.
3. Spread mix at minimum temperature of 250 deg F (121 deg C).
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations.".
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.7 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 with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

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 hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927, but not less than 94 percent nor greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

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.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement 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. Surface 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 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

1. Reference maximum theoretical density will 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.
2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

    a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
    b. 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.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.10 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION 321216

SECTION 321313 - CEMENT CONCRETE PAVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and any Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK:

A. General

1. Extent of cement concrete paving is shown on drawings for all walks.

2. Prepared subbase is specified in Division 31 Section 312000 Earthwork.

1.3 QUALITY ASSURANCE:

A. Codes and Standards

1. Comply with local governing regulations if more stringent than herein specified.

B. Submittals

1. Furnish samples, manufacturer's product data, test reports and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

1.4 JOB CONDITIONS:

A. No concrete shall be placed in the work when the temperature is below 32^{o}F or when the temperature is likely, in the opinion of the Owner's Representative, to drop to 32^{o}F within the next 24 hours, except with the prior approval of the Owner's Representative and under special protective measures approved by the Owner's Representative.

PART 2 – PRODUCTS

2.1 MATERIALS:

A. Forms

1. Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms free of distortion and defects.

2. Use flexible spring steel forms or laminated boards to form radius bends as required.

3. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

B. Welded Wire Mesh

1. Welded plain cold-drawn steel wire fabric, ASTM A 185.

C. Reinforcing Bars

1. Deformed steel bars, ASTM A 615, Grade 40.

D. Concrete Materials

1. Comply with requirements applicable for concrete materials, admixtures, bonding materials, curing materials and others as required.

E. Expansion Joint Materials

1. Comply with requirements for preformed expansion joint fillers and sealers.

PART 3 – EXECUTION

3.1 CONCRETE MIX, DESIGN AND TESTING:

A. General

1. Comply with requirements applicable for concrete mix design, sampling and testing, and quality control, and as herein specified.

1. Design mix to normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticizer), air-entraining admixture and water to produce the following properties:

a. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated.

b. Slump Range: 4 inches for concrete containing HPWR admixture (super-plasticizer); 4 inches for other concrete.

c. Air Content: 4.5 to 7.5 percent.

3.2 SURFACE PREPARATION:

A. General

1. Remove loose material from compacted subbase surface immediately before placing concrete.

2. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.3 FORM CONSTRUCTION:

A. General

1. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

2. Check completed formwork for grade and alignment to following tolerances:

a. Top of forms not more than 1/8 inch in 10 feet.

b. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

3. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.4 REINFORCEMENT:

A. General

1. Locate, place and support reinforcement as shown on details, unless otherwise indicated.

3.5 CONCRETE PLACEMENT:

A. General

1. Comply with requirements for mixing and placing concrete and as herein specified.

2. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

3. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator.

4. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

5. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3.6 JOINTS:

A. General

1. Construct expansion, weakened-plane (contraction) and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

2. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints

1. Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such placements terminate at expansion joints.

C. Expansion Joints

1. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

2. Locate expansion joints at 20 feet o.c. maximum, unless otherwise indicated.

3. Extend joint fillers full-width and depth of joint, recessed 1/2 inch below finished concrete surface.

4. Furnish joint fillers in one-place lengths for full width being place.

5. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

D. Fillers and Sealants

1. All joints shall receive joint sealants. Comply with requirements for preparation of joints, materials, installation and performance.

3.7 CONCRETE FINISHING:

A. General

1. Protect and cure finished concrete paving as specified on the plans and details. Use membrane-forming curing and sealing compound or approved moist-curing methods.

B. Anti-Spalling Treatment

1. A second coat of curing and sealing compound may be used or an anti-spalling compound applied over concrete cured by continuous moist curing methods. Apply compounds to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 square feet per gallon. Apply anti-spalling compound in two sprayed applications. First application at rate of 40 square yards per gallon; second application, 60 square yards per gallon. Allow complete drying between applications.

3.8 REPAIRS AND PROTECTIONS:

A. General

1. Repair or replace broken or defective concrete, as directed by Owner's Representative.

2. Drill test cores where directed by Owner's Representative when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

3. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction

traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

4. Sweep concrete pavement and wash free of stains, discolorations, dirt and foreign material just prior to final inspection.

END OF SECTION 321313

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Galvanized steel chain link fabric.
2. Galvanized steel framework.
3. Hardware for swing gates.
4. Privacy slats

B. Earthwork for filling and grading work is specified in Division 31 Section "Earthmoving."

C. Concrete for post footings is specified in Division 32 Section "Concrete Paving."

1.2 SUBMITTALS

A. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.

B. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

C. Samples for Initial Selection: Manufacturer's color charts or 6-inch (150-mm) lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has at least ten years' experience and has completed chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.

B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 FABRIC

A. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:

1. Zinc-Coated Steel Wire Mesh and Wire Size: 2-inch mesh, 0.120-inch diameter (11 gage).
2. Selvage: Knuckled on both selvages.

2.2 FRAMING

A. Type I Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90.

B. Type II Round Posts: Cold-formed, electric-welded steel pipe conforming to heavy industrial requirements of ASTM F 669, Group IC, with minimum yield strength of 50,000 psi; type B outside coating with a minimum of 0.9 oz. of zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat; type B inside with a minimum of 0.9 oz. of zinc per sq. ft. or Type D inside with a minimum 0.3-mil-thick, 81-percent zinc-pigmented nominal coating.

C. Drawings indicate trade sizes, while specifications indicated actual sizes, refer to the actual and NPS sizes listed below. Provide pipe conforming the the type indicated with the weights per foot indicated.

Actual OD	NPS Size	Trade Size	Type I Weight (lb/ft)	Type II Weight (lb/ft)
1.315	1	1-3/8	1.68	1.35
1.660	1-1/4	1-5/8	2.27	1.84
1.900	1-1/2	2	2.72	2.28
2.375	2	2-1/2	3.65	3.12
2.875	2-1/2	3	5.79	4.64
3.500	3	3-1/2	7.58	5.71
4.000	3-1/2	4	9.11	6.56

D. Top Rail: Manufacturer's longest lengths with expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull, and end post.

1. Round Steel: 1.660-inch OD Type I or II steel pipe.

E. Round steel posts:

1. Line or Intermediate Posts: 2.375-inch OD Type I or II steel pipe.
2. End, Corner, and Pull Posts: 2.875-inch OD Type I steel pipe.

F. Swing Gate Posts: Furnish posts to support single gate leaf, or one leaf of a double-gate installation, according to ASTM F 900, sized as follows for steel pipe posts:

1. Steel posts for fabric height of 6 feet or less and gate leaf width:

a. Up to and Including 4 Feet: 2.375-inch OD, Type I pipe.
b. Over 4 to 10 Feet: 2.875-inch OD, Type I pipe.

2. Steel posts for fabric height over 6 feet and gate leaf width:
a. Up to and Including 6 Feet: 2.875-inch OD, Type I pipe.
b. Over 6 to 12 Feet: 4.000-inch OD Type I pipe.
c. Over 12 to 18 Feet: 6.625-inch OD Type I pipe

2.3 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F 626. Galvanized iron or steel to suit manufacturer's standards.

1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.

B. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

C. Post Brace Assembly: Manufacturer's standard adjustable brace. 1.660-inch OD Type I or II steel pipe brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.

D. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.

E. Tension and Brace Bands: 3/4-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.

1. Tension Bands: 0.074 inch thick (14 gage) minimum.
2. Brace Bands: 0.105 inch thick (12 gage) minimum.

F. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.

1. Coating Type II zinc, ASTM A 90, Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

G. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3 or equal, to match fabric wire.

2.4 CONCRETE

A. Concrete: Provide concrete conforming to requirements of Division 32 Section "Concrete Paving."

2.5 GATES

A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.

1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.
2. Bracing: Install diagonal cross-bracing consisting of 5/16-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.

B. Swing Gates: Comply with ASTM F 900.

1. Steel: Gates up to 8 feet wide:
   a. Fabricate perimeter frames of 2-inch-square galvanized-steel tubing weighing 2.52 lb per sq. ft.

2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
   a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
   b. Latch: Fulcrum type with strike strap to permit operation from either side of gate, with padlock eye as an integral part of latch.
   c. Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.

2.6 PRIVACY SLATS

A. Material: Fiber-glass-reinforced plastic, UV-light stabilized, not less than 0.06 inch (1.5 mm) thick, sized to fit mesh specified for direction indicated; with vandal-resistant fasteners and lock strips.

1. Color: Green, with simulated hedge texture.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.

1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
   a. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.

G. Top Tension Wire: Install tension wire through post cap loops before stretching fabric. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.

H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.

I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

J. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.

1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.

L. Privacy Slats: Install slats in direction indicated, securely locked in place

1. Diagonally

3.2 GATE INSTALLATION

A. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.

3.3 ADJUSTING

A. Gates: After repeated operation of completed installation equivalent to 3 days' use by normal traffic, readjust gates and controls for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

END OF SECTION 323113