Project Manual
Volume 1 of 1

NYACK UNION FREE SCHOOL DISTRICT
13A Dickinson Avenue Nyack, NY 10960

District Wide Air Conditioning
Cafeterias & Global Learning Commons

SED #50-03-04-03-0-004-020	NYACK MIDDLE SCHOOL
SED #50-03-04-03-0-006-016	LIBERTY ELEMENTARY SCHOOL
SED #50-03-04-03-0-001-016	VALLEY COTTAGE ELEMENTARY SCHOOL
SED #50-03-04-03-0-007-023	UPPER NYACK ELEMENTARY SCHOOL

06 NOVEMBER 2023 BID ISSUE

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

Engineering Consultant: **BGA & ASSOCIATES**
39 Marble Avenue
Pleasantville, NY 10507
914.328-6060

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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ADVERTISEMENT FOR BIDS

Nyack UFSD District Wide Air Conditioning Cafeteria & Global Learning Commons Project

The Nyack Union Free School District will receive individual sealed proposals by Wednesday December 6, 2023, at 2 PM, for the District Wide Air Conditioning Cafeteria & Global Learning Commons Project.

Nyack Union Free School District
13A Dickinson Ave.
Nyack, NY 10960

The Nyack Union Free School District will receive bid proposals at the Business Office, 13A Dickinson Avenue, Nyack NY 10960, and at that time and place any and all such proposals 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 in order to make their proposals, and each bid proposal must be made in accordance with those Forms.

Bidders may obtain the Bid Documents after **12 PM on Tuesday, November 7, 2023,** from REV, 330 Route 17A, Goshen, NY, 10924, 877.272.0216. Complete digital sets of Bidding Documents, drawings and specifications, may be obtained online as a download at the following website: https://revplans.biddyhq.com under 'Public Projects.' Complete hard-copy sets of Bid Documents, drawings and specifications, may be obtained upon depositing the sum of $100 for each combined set of documents. Checks or money orders shall be made payable to Nyack Union Free School District. Plan deposit is refundable in accordance with the terms in the Instructions to Bidders to all submitting bids. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs.

Please note Rev (https://revplans.biddyhq.com) is the designated location and means for distributing and obtaining all bid package information. All bidders are urged to register to ensure receipt of all necessary information, including Bid Addenda.

There will be a pre-bid site meeting on **Wednesday, November 15, 2023 at 1 PM** commencing at the Nyack Hilltop Administration Building (13A Dickinson Ave, Nyack, NY 10960). **Bidders are urged to attend the site meeting. Knowledge of the field conditions is crucial to understanding the Work.**

All Requests for Information must be sent in writing using the **RFI form** in the Bid Documents to

the Architect **via email** (malicea@kgdarchitects.com) no later than **5:00 PM, Tuesday, November 28, 2023** and will be responded to via Addendum by **5:00 PM on Wednesday, November 29, 2023.**

Any proposal must be accompanied by a certified check payable to the Nyack Public School District or by a Bid Bond for a sum equal to ten percent (10%) of the bid, conditioned as set forth in the Instructions to Bidders.

All bid security, except those of the three low bidders will be returned after formal analysis and evaluation of the Bids received. The bid security provided by the three low bidders will be returned after the execution of the Trade Contract. Forty-five (45) days after the opening of bids, if the bidder has not received notice of contract award, upon bidder's request, the bid security will be returned.

The District will 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. As required by Section 222 of the New York Labor Law, the District will require each contractor and subcontractor performing work on the Project to participate in apprentice training programs in the trades of work it employs, which programs must have been approved by the New York State Department of Labor for not less than three (3) years and must have at least one apprentice currently enrolled in the training program.

The successful bidder shall be required to comply with the provisions of the New York State Prevailing Wage Law. Information can be obtained at https://www.labor.ny.gov/workerprotection/publicwork/PWContents.shtm

Please note that certified payroll must be submitted with all invoices. Invoices will not be processed if the certified payroll is not provided. The Contractor must comply with all applicable Federal regulations as described in the bid documents.

Attention is called to the fact that not less than the minimum salaries and wages as set forth in the specifications, or the latest revision thereof, must be paid on this project. The Contractor must comply with the "Equal Opportunity for Employment" requirements as promulgated by the Federal and State governments and as described in the bid documentation.

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

Nyack Union Free School District
Professional Development Center Project
Opening Date: Wednesday, December 6 at 2 PM
Bid Package #
Name of Bidder
"SEALED BID"

Any proposal must be delivered to the District Business Office, 13A Dickinson Avenue, Nyack, NY 10960, to Dr. Grace Chan, Assistant Superintendent for Finance & Operations, or her designee, no later than the appointed time on the bid opening date. The District will not open or consider any proposal unless it is received at that location by no later than the appointed time 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.

To the fullest extent allowed by law, the Nyack Public School District reserves the right to reject

all bids, to re-advertise for new bids, to reject any bid that contains an omission(s), an exception(s) or a modification(s), or in its sole discretion to waive what it deems to be an informality or irregularity in the bidding process, to waive what it deems to be an informality, irregularity, omission or technical defect with respect to a specific bid proposal received and to afford any Bidder an opportunity to remedy any informality or irregularity if it is in the School District's interest to do so.

END OF ADVERTISEMENT

SECTION 002100 - INVITATION AND INSTRUCTIONS TO BIDDERS

1.1 OWNER, PROJECT, ARCHITECT, BID PROCEDURE

A. The Owner, Nyack Union Free District; located at 13A Dickinson Ave. Nyack, NY 10960 invites sealed bids for District Wide Air Conditioning and Valley Cottage Cafeteria & Library project as described in the accompanying contract documents as prepared by KG+D Architects, P.C. located at 285 Main Street; Mt. Kisco, NY 10549.

B.

C. Bids shall be received in accordance with the New York State Public Bidding Laws, this project will be executed under MULTIPLE CONTRACTS as noted below:
- Contract #1 – General Construction
- Contract #2 – HVAC
- Contract #3 – Electrical

D. The attention of all bidders is directed to the fact that a single set of documents exist for the construction of the Project as a whole. Work on each sheet, or within any technical specification section may or may not have an effect on the work of any single Contractor. Failure on the part of any Contractor to examine all documents will not be cause for additional cost to the Owner.

1.2 DISCREPANCY

A. Should any bidder find any discrepancies in, or omission from, the Contract Documents, or should the bidder be in doubt as to the meaning of any portion of said documents, they shall at once notify the Architect and obtain an interpretation or clarification prior to submission of their bid.

B. Any request for interpretation or clarification given in accordance with this provision shall be in writing.

C. The bidder may, during the bidding period, be advised by addendum of additions, deletions, or alterations in any of the documents forming a part of this Contract. All such additions, deletions or alterations shall be included in the work covered by the bid and shall become a part of this Contract.

Upon such mailing or delivery and making available for inspection, such addendum shall become a part of the Contract Documents and shall be binding on all Bidders whether or not the Bidder receives or acknowledges the actual notice of such addendum.

The requirements contained in all Contract Documents shall apply to all addenda.

CUTOFF DATE FOR RECEIPT OF REQUESTS FOR INFORMATION (RFI'S) SHALL BE 5 WORKING DAYS PRIOR TO DESIGNATED DATE FOR RECEIPT OF BIDS.

D. Only interpretations, corrections or additional Contract provisions made in writing by the Architect as addenda shall be binding. No officer, agent or employee of the Owner or the Architect is authorized to explain or to interpret the Contract Documents by any other method and any such explanation or interpretation, if given, shall not be relied upon by the Bidder.

1.3 REPRESENTATION - Each bidder, by making their bid, represents that -

A. They have read and understands the Bidding Documents (consisting of the Project Manual, Drawings and Addenda (if any)) and their Bid is made in accordance therewith.

B. They have visited the site and have familiarized themselves with the conditions under which the work is to be performed.

C. All materials to be incorporated in the work shall be "asbestos free" in their manufacture.

1.4 DOCUMENTS

A. Bidders may obtain the Bid Documents after **12 PM on Tuesday, November 7, 2023,** from REV, 330 Route 17A, Goshen, New York 10924 Tel: 845-651-3845. Complete digital sets of Bidding Documents, drawings and specifications, may be obtained online as a download at the following website: https://revplans.biddyhq.com under 'public projects.' Complete hard copy sets of Bidding Documents, drawings and specifications, may be obtained upon depositing the sum of $100 for each combined set of documents. Checks or money orders shall be made payable to Nyack Union Free School District. Plan deposit is refundable in accordance with the terms in the Instructions to Bidders to all submitting bids. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs.

B. Please note REV (https://revplans.biddyhq.com) is the designated location and means for distributing and obtaining all bid package information. All bidders are urged to register to ensure receipt of all necessary information, including bid addenda.

1.5 INFORMATIONAL MEETING - All bidders are advised that an informational meeting will be held as follows:

A. Date – **Wednesday, November 15, 2023**

B. Local Prevailing Time – **1:00 PM**

C. Location – **Nyack Hilltop Administration Building (13A Dickinson Ave, Nyack, NY 10960)**

D. Any and all questions that may arise as a result of this meeting will be recorded and answered by the Addendum process.

NOTE: ALL BIDDERS WILL BE PRESUMED TO HAVE FULL KNOWLEDGE OF THE SITE, AND ALL INFORMATION AVAILABLE AT THE PRE-BID WALK THROUGH. NO EXTRA COST OR TIME EXTENSIONS WILL BE GRANTED BECAUSE OF LACK OF KNOWLEDGE OF ON SITE CONDITIONS, APPARENT, OR DATA AVAILABLE DURING THE WALK THROUGH.

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

1.6 BIDDING

A. Sealed bids, with the name and address of the Bidder contained thereon, will be received at the District Office **by 2PM on Wednesday, December 6, 2023**. Local Prevailing Time at which time all bids will be opened publicly and read aloud.

B. All bids shall be submitted in duplicate on the Proposal Forms provided within the specifications and shall be submitted in an opaque sealed envelope with the following contained thereon:
   1. Project Name.
   2. Contract Number.
   3. Type of Construction.
   4. Name of Bidder.
   5. Mark “SEALED BID”.

C. All spaces on Proposal Form must be completed. All signatures shall be in ink and in longhand.

D. No oral or telephonic proposals or modifications of proposals will be considered.

E. Any proposals containing exceptions or modifications may, at the Owner's option, be disqualified.

1.7 QUALIFICATIONS OF BIDDER

A. The Owner 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 to the Owner all information and data required by the Owner, including complete financial data, within the time and in the form and manner required by the Owner.

C. The Owner reserves the right to reject any bid if the evidence required by the Owner is not submitted as required or if the evidence submitted by or the investigation of any Bidder fails to satisfy the Owner that the Bidder is responsible or is able or qualified to carry out the obligations of the Contract or to complete the Work as contemplated.

1.8 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. When requested by the Architect, 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 shall furnish within three (3) working days after the bid opening four (4) copies of the following information in writing:
   1. a signed and notarized bidder qualification statement (see Section 00 45 13);
   2. the names, addresses and phone numbers of the subcontractors and suppliers that the bidder proposes to use on the project;
   3. the bidder's proposed site safety plan;

4. a bar chart (see paragraph 1.03, Section 013200 of the General Requirements) showing the bidders' proposed plan and schedule to complete the bidder's work in accordance with the phasing milestones outlined in Section 01 10 00;
5. the insurance certificates required by the Bid Documents;
6. 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.

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 like 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 Trade 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.

1.9 APPROVAL OF SUBCONTRACTORS

A. When requested by the Owner, Bidders shall, within the time specified by the Owner, submit to the Owner the names of the Subcontractors which the Bidder proposes to use on the project.

B. 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 like manner within the time specified by the Owner.

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

1.10 SECURITY AND BONDS (Coordinate with Section 006100)

A. Every bid shall be accompanied by a Bid Bond in the amount of 10 percent of the

Contract Sum drawn by a recognized surety authorized to conduct business in the State of New York and made payable to the Owner.

1. Bid Security shall be submitted in a separate sealed envelope clearly identifying the company and project as well as the name and address of the Surety Company.
2. Each Bond must be accompanied by a Power of Attorney, giving names of Attorneys-in-fact, and the extent of their bonding authority. All bonds shall be countersigned by a resident Agent and with a Surety Company or Corporation meeting the following qualifications:
   a. Surety must be licensed to do business in the State of New York.
   b. Surety shall be listed on the current U.S. Treasury Department Circular 570 entitled "Companies Holding Certificates of Authority" from the Secretary of the Treasury under the Act of Congress approved July, 30, 1974 (6 U.S.C., Sec. 6-13), as Acceptable Sureties on Federal Bonds.
   c. Surety must meet minimum rating requirements as published in current "Best's Key Rating Guide" as listed in the attachment to Section 00 61 00.
   d. Limitations:
      - Bonding limits or bonding capacity refers to the limit or amount of bond acceptable on any one project.
      - The bonding limit for each contractor shall not exceed the amount listed on the above referenced U.S. Treasury Department List for the Surety issuing the bond.
   e. All Surety companies are subject to approval and may be rejected by the Owner without cause, in the same manner that bids may be rejected.
   f. Compliance: In the event any of the requirements outlined herein are not complied with, the Owner shall have the right to reject the bid or annul the Award of the Contract.

B. Bid security will be returned to all except the three lowest bidders, after formal analysis and evaluation of bids. No bid will be withheld beyond the forty-five (45) day period stipulated above.

C. Remaining bid security will be returned to bidders after Owner and successful bidder have executed the Agreement and the Owner has received and approved performance and payment bonds.

D. If the required agreement has not been executed within the specified period of time after the bid opening, bid security of any bidder will be returned upon his request, provided he has not been notified of acceptance of his bid prior to the date of his request.

E. Separate Performance and Payment Bonds will be required for the work. Each shall be in the amount of 100% of the Contract price.

F. The Contractors shall include in their proposal amounts the total premiums for the performance and labor and material payment bonds as set forth in Section 00 61 00.

1.11 TAX STATUS (Coordinate with Article 3.6 of Section 007000 (AIA A232)

A. The Owner, Nyack Union Free School District, is an educational non-profit institution 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.

B. Exemption Certificates will be furnished to each Respective Prime Contractor.

1.12 INSURANCE

A. Insurance as required by Article 11 of the General Conditions and as set forth in the Insurance Rider (Section 007002) shall be required of each Respective Prime Contractor and shall be of forms and limits required therein.

1.13 EQUIVALENCY CLAUSE (Coordinate with Section 012500)

A. When in the project manual/specifications, two or more kinds, types, brands, or manufacturers of materials are named they are regarded as establishing the required standard of quality and not for the purpose of limiting competition.

B. The contractor may select one of these items or, if the contractor desires to use any kind, type, brand, manufacturer or material other than those named in the specification, he shall, in accordance with the instructions set forth in “Post-Bid Requirements” herein, identify within three (3) days after bid submission, but in any event prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified item following procedures set forth in Section 012500.

C. Failure to so identify the perceived “equivalencies”, will not relieve contractor from providing the specified items.

1.14 AWARD OF CONTRACT

A. This notice is an offer to receive proposals for a contract and not an offer of a contract.

B. The award of the Contract shall be made to the Bidder submitting the lowest bid if, in the opinion of the Owner, such Bidder is qualified to perform the Work involved, is responsible and reliable.

C. Alternates, if stated in the Proposal Form, shall be chosen at the discretion of the Owner when awarding the Contract. The lowest bid will then be determined by adding to, or subtracting from, to the bidder's total base bid, all Alternates chosen by the Owner.

D. The Bidder agrees to commence work within ten (10) days of receipt of a Notice to Proceed, Letter of Intent, and/or Execution of Contract whichever is earlier.

E. The Owner reserves the right to reject any bid or all bids, to waive any informalities or irregularities or omissions in any bid received or to afford any Bidder an opportunity to remedy any informality or irregularity if it is in the Owner's interest to do so.

F. The award of the Contract shall not be construed as a guarantee by the Owner that the plant, equipment and the general scheme of operations of a Bidder is either adequate or suitable for the satisfactory performance of the Work or that other data

supplied by a Bidder is accurate.

1.15 LAWS AND REGULATIONS

A. All applicable Federal, State, County, Municipal or other laws, orders, ordinances, rules and regulations of all Authorities having jurisdiction over construction work in the locality of the project shall apply to the Contract and shall be deemed to be included in the Contract as if fully set forth therein at length.

B. This project is subject to wage determination as issued by the Department of Labor. Reference Section 004643.

C. 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”.

1.16 ARREARS

A. No bids will be accepted from, or contracts awarded to, any person, persons, firms or vendors who are in arrears to the Municipality upon debt, or contract, or who is a defaulter as surety or otherwise upon obligations to the Municipality.

1.17 NONDISCRIMINATION

A. Notwithstanding implementation of the Owner's Affirmative Action Plan, if any, all Contractors and Subcontractors of all tiers and vendors will be required to comply with all provisions of the Civil Rights Act of 1964, Executive Order 11246 of 24 September 1965 and the relevant "Laws", "Acts" rules, regulations and orders of the Labor Department of the State of New York as amended.

B. Liquidated Damages may be assessed for each and every calendar day that the work is not complete, after the above stated time for total completion of the work at the rates established in the General Conditions, Section 007000.

End of Invitation and Instructions

SECTION 004100 - PROPOSAL FORM

PROJECT: Nyack Union Free School District
District Wide Air Conditioning, Cafeteria & Global Learning Commons

DATED: _____

To: Nyack UFSD District Office
13A Dickinson Ave.
Nyack, NY 10960

Greetings:

The Undersigned, in compliance with the Invitation and Instructions to Bidders, agrees that if this bid is accepted as hereinafter provided he/she will provide all labor, materials, supplies, tools, plant and equipment necessary to perform all work required for the construction of the aforementioned project in accordance with documents as prepared by KG+D, Architects, P.C.; 285 Main Street, Mount Kisco, NY., Telephone: 914-666-5900 for the class of work at the aforementioned project as listed below:

_____
(#1 - GENERAL CONSTRUCTION) (#2 - HVAC) (#3 - ELECTRICAL)

(Each Bidder shall indicate in line above, class of work the Proposal is being submitted for.)

for the following LUMP SUM COST as applicable to the particular contract:

_____

_____Dollars ($_____)

Further, the undersigned:

- agrees to execute alternates selected for the sums (additive or deductive) set forth in the attached schedule of Alternate Proposals.
- agrees to the stated percentages for extra work if ordered on a Time and Material basis in accordance with Article 7 of the Conditions to cover all overhead and profit allowance.
- Takes notice of the time constraints set forth in Section 011000 and agrees to the terms of the Contract and to the Actual Damages that will be enforced should the time constraints not be kept.

It is understood that the Owner reserves the right to accept or reject any and all bids that the Owner deems to be in his best interest.

Upon notification of acceptance of this proposal, the undersigned agrees to execute a contract in the form as stated within these contract documents for the amount stated.

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

Prices quoted shall be guaranteed for forty-five (45) days after date of proposal.

If written Notice to Proceed, Letter of Intent or Contract is received within forty-five (45) calendar days after the opening of bids, the undersigned agrees to execute said contract and furnish to the Owner within ten (10) days after receipt of said notice of award, the executed Contract, together with the Performance Bond, Labor and Material Payment Bonds and Insurance Certificates required herein.

The Undersigned agrees that the Bid Security payable to Owner accompanying this proposal is left in escrow with the Owner; that its' amount is the measure of liquidated damages which the Owner will sustain by the failure of the Undersigned to execute and deliver the above named Bonds and Contract; and that if the undersigned defaults in furnishing said bonds or in executing and delivering said Contract within ten (10) days of written notification of award of the Contract to him/her, then said Security shall be payable to the Owner for its' own account; but if this proposal is not accepted within said forty five (45) days of the time set for submission of Bids, or if the Undersigned executes and delivers said bonds and Contract, the Bid Security shall be returned to the Undersigned.

The following Addenda have been received. The noted modifications to the Bid Documents have been considered and all costs are included in the Bid Sum.

Addendum	Date	Acknowledgment

The Undersigned has included with this Bid attachments noted:

1. Attachment #1: Alternate Proposals

By submission of this Proposal, the undersigned acknowledges that they have read the milestone and schedule requirements, Section 011000, and agrees to provide sufficient staff and organization as well as to select subcontractors, suppliers and vendors to comply with the requirements for submittals, delivery dates, work periods and completion dates as specified.

The Undersigned hereby certifies that they are able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.

NON-COLLUSIVE AFFIDAVIT

Every bid or proposal made to a political subdivision of the State or any public department, agency or official thereof or to a fire district or any agency or official thereof, for work or services performed or to be performed or goods sold to or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury and is made pursuant to Section 103d of the General Municipal Law of the State of New York as amended by Laws of 1966.

NON-COLLUSIVE BIDDING CERTIFICATION

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

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

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

Further, by submission of this Proposal

- each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the state finance law."
- the Undersigned acknowledges that they have visited the site, informed themselves of the existing conditions, and have included in the Proposal a sum to cover the costs of all items in the contracts.

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Respectfully submitted,

_____
Contractor

By_____Title_____

Business Name:_____

Address:_____

Telephone Number:_____

Attest:_____Title_____

SEAL IF CORPORATION

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

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

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

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

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

I, _____, being duly sworn, deposes and

says that he/she is the _____ of the

_____ Corporation and that neither the Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

_____
SIGNED

SWORN to before me this _____ day of _____ 201___

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

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):

_____

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

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 _____201___

Notary Public: _____

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

ATTACHMENT #1 - SCHEDULE OF ALTERNATE PROPOSALS

In accordance with the terms and conditions of the Contract and the Proposal Form, the undersigned agrees to execute alternates selected for the sums set forth in the following schedule of Alternate Proposals in accordance with the general description outlined in Section 01 10 00 and Section 01 23 00.

Electrical Alternate #1: Summer 2024 Electric Service – Nyack Middle School and Upper Nyack Elementary School Cafeterias

Description: Provide bus taps as shown in the drawings to the existing main distribution board to provide power to the new HVAC units in the cafeterias.

State the amount to be ADDED to the Base Bid for Alternate #1.

ADD _____

_____ Dollars ($_____)

Electrical Alternate #2: Summer 2024 Electric Service – Liberty Elementary School Cafeteria

Description: Provide bus taps as shown in the drawings to the existing main distribution board to provide power to the new HVAC units in the cafeteria.

State the amount to be ADDED to the Base Bid for Alternate #2.

ADD _____

_____ Dollars ($_____)

End of Alternate Schedule

End of Proposal Form

SECTION 004513 - BIDDER QUALIFICATION STATEMENT

After receipt of bids and upon notification from the Architect, the bidder shall answer all questions set forth in the form within the time required in Article 1.07 of the Invitation and Instructions to Bidders. Failure to answer these questions in full may be cause for rejection of the bidder's proposal. If more space is required, please attach additional sheets.

1. How many years has your organization been in business under your present business name? _____

2. How many years experience in construction work of a similar type has your organization had? _____

3. List below the construction projects your organization has under way as of this date:

Contract Sum	Class of Work/%Complete	Name/Address of Owner	Name & Phone # of Contact at Owner

4. List below a minimum of three (3) projects which your firm, <u>as a firm</u>, has performed in the past five (5) years which you feel will qualify you for this work.

Contract Sum	Class of Work/%Complete	Name/Address of Owner	Name & Phone # of Contact at Owner

5. Have you ever failed to complete any work awarded to you?
□ Yes □ No; If Yes, where and why?

_____

_____

_____

6. Has any officer or partner of your organization ever been an officer or partner of some other organization that failed to complete a construction contract? □ Yes □ No; If Yes, state:

Name of Individual(s)	Name of Owner(s)	Reason(s)

7. Has any officer or partner of your organization ever failed to complete a construction contract handled in his own name?
□ Yes □ No; If yes, state:

Name of Individual(s)	Name of Owner(s)	Reason(s)

8. Has your firm or organization ever received a Notice of Default or Notice of Termination or ever been defaulted or terminated on a Project.

The undersigned hereby authorizes and requests any firm, person or corporation to furnish any information requested by the Owner or Architect in verification of the matters contained in the Bidder Qualification Statement.

Dated _____, 20____

_____
(Name of Bidder)

By _____

AFFIDAVIT

STATE OF) S.S.
COUNTY OF)

_____ being duly sworn and says that he/she is

_____ of _____
(Title) (Name of Organization)

and that the answers to the foregoing interrogatories and all statements therein contained are true and correct.

Subscribed and sworn to before me

this _____ day of _____ 20____

_____
Signature

_____

Notary Public, County of _____

End of Section

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

HOLD HARMLESS AGREEMENT

In accordance with Article 3.18 of the General Conditions, Indemnification, the Contractor will be required to sign the following "Hold Harmless" Agreement with the BOARD OF EDUCATION ("Owner"). Compliance with the foregoing requirements for insurance shall not relieve the Contractor from liability set forth under the Indemnity Agreement.

The undersigned hereby agrees to defend, indemnify, and save harmless the (1) Owner, its consultants, employees, officers and agents, and (2) Architect/Engineer, its consultants, employees, officers and agents, from and against any and all liability, loss, damages, claims for bodily injury and/or property damages, cost and expense, including counsel fees, to the extent permissible by law, that may occur or that may be alleged to have occurred in the course of the performance of this agreement by the contractor, whether such claims shall be made by an employee of the Contractor or by a third party, the Contractor covenants and agrees that he will pay all costs and expenses arising therefrom and in connection therewith, and if any judgment shall be rendered against the Owner and/or Architect/Engineer, in any such litigation, the Contractor shall at his own expense satisfy and discharge the same.

By: _____
(Signature of Authorized Representative of Corporation)

_____
(Print Name and Title)

_____
(Date)

SECTION 004643 - WAGE AND HOUR RATES

1.1 GENERAL

A. The following are instructions for obtaining the minimum wage rates, health and welfare and pension fund contributions as determined by the Industrial Commissioner of the State of New York in accordance with the provisions of Section 220 of the Labor Law.

B. All contractors will be bound and obligated by the Laws of New York State to ensure payment to all workers involved with the construction of the Project.

1.2 MINIMUM WAGE RATES

A. The current wage and benefit rates are available when following the instructions on the attached page.

The "Request for Wage and Supplement Information" (PW 39) you have submitted has been accepted, and a Prevailing Rate Case Number (PRC# 2022004731 - DW AC, Cafeteria & GLC) has been assigned to the project.

To access the PDF file of your schedule, click on https://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1531469 or copy and paste into your browser

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor *where the basis of payment is a Stipulated Sum*

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)

Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960
Telephone 845.353.7000

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

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

Nyack UFSD District Wide Air Conditioning, Cafeteria & Global Learning Commons
Nyack Middle School, 98 South Highland Ave.
SED # 50-03-04-03-0-004-016
Liberty Elementary School, 142 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-006-016
Upper Nyack Elementary School, 336 North Broadway, Upper Nyack, NY 10960
SED # 50-03-04-03-0-007-023
Valley Cottage Elementary School, 26 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-001-016

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

KG+D Architects, PC
285 Main Street
Mount Kisco, NY 10549
Telephone 914.666.5900

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.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

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 a Modification, 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 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

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(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:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates: **Not applicable**

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, 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 ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 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

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

Item	Price

§ 4.4 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)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

$1,000.00 per calendar day assessed for each and every calendar day after the completion date and after each milestone date, (refer to section 8.3 of the AIA Document A201-2017 General Conditions)

§ 4.6 Other: **Not applicable**
(Insert provisions for bonus 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 Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the 15th day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the 15th day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 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 Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 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.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 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.

§ 5.1.6.2 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 A201–2017;

.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 A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

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

Five percent (5%)

§ 5.1.7.1.1 The following items are not subject to retainage: **Not applicable**
(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: **Not applicable**
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, 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 at Substantial Completion deduct two times the amount the Architect shall determine for incomplete work and unsettled claims and liens.
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 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.

§ 5.2 Final Payment

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

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

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

§ 5.3 Interest

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.)

Two percent (2%) per annum.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the 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

The method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[X] Litigation in a court of competent jurisdiction in the County of Rockland in the state of New York.

[ ] 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 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017 no termination fee will be paid by Owner.
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to AIA Document A201–2017, the reference refers to AIA Document A201-2017 as revised for this project. Where reference is made in this Agreement to a provision of AIA Document A201–2017 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)

Gloria Menoutis
Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960

§ 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 Article 11 of AIA Document A201™–2017, the Insurance Rider (Section 00 70 02), and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in Article 12 of AIA Document A201™–2017, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, 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.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A201™–2017, General Conditions of the Contract for Construction

.3 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 E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[ ] 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 A201™–2017 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 entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
, President, Board of Education	
(Printed name and title)	*(Printed name and title)*

SECTION 006100 - BOND REQUIREMENTS

SEE ATTACHMENT TO SECTION FOR ACCEPTABLE BONDING COMPANY RATINGS

1.1 Prior to the Owner signing the contract agreement, he will require the Contractor (s) to furnish separate performance and labor and material payment bonds covering the faithful performance of the entire construction contract agreement.

The performance bond and the labor and material payment bond shall each be made out in one hundred percent (100%) of the guaranteed maximum contract amount.

1.2 The "Performance Bond" and "Labor and Material Payment Bond", A.I.A. Document A-312, as published by The American Institute of Architects shall be used and modified, if necessary, to comply with applicable statutes.

NOTE: Date of forms to be used shall be complementary to the date of the contract form and general conditions incorporated within these Bidding and Contract Requirements.

1.3 The bonds shall be signed by an official of the bonding company and shall be accompanied by the bonding agent's written power of attorney.

1.4 Provide four (4) copies each of the bonds and the power of attorney in order that one (1) copy of each may be attached to each copy of the contract agreement.

1.5 The Contractor (s) shall include in his/their proposal(s) amount the total premiums for the performance and labor and material payment bonds.

End of Section

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)
Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Nyack UFSD District Wide Air Conditioning, Cafeteria & Global Learning Commons
Nyack Middle School, 98 South Highland Ave.
SED # 50-03-04-03-0-004-016
Liberty Elementary School, 142 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-006-016
Upper Nyack Elementary School, 336 North Broadway, Upper Nyack, NY 10960
SED # 50-03-04-03-0-007-023
Valley Cottage Elementary School, 26 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-001-016

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.

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.
/

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.

Signed and sealed this day of ,

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

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)
Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960

CONSTRUCTION CONTRACT
Date:
Amount: $ 0.00
Description:
(Name and location)
Nyack UFSD District Wide Air Conditioning, Cafeteria & Global Learning Commons
Nyack Middle School, 98 South Highland Ave.
SED # 50-03-04-03-0-004-016
Liberty Elementary School, 142 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-006-016
Upper Nyack Elementary School, 336 North Broadway, Upper Nyack, NY 10960
SED # 50-03-04-03-0-007-023
Valley Cottage Elementary School, 26 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-001-016

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.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:		Name and Title:	
Address:		Address:	

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)
Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960

CONSTRUCTION CONTRACT
Date:
Amount: $ 0.00
Description:
(Name and location)
Nyack UFSD District Wide Air Conditioning, Cafeteria & Global Learning Commons
Nyack Middle School, 98 South Highland Ave.
SED # 50-03-04-03-0-004-016
Liberty Elementary School, 142 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-006-016
Upper Nyack Elementary School, 336 North Broadway, Upper Nyack, NY 10960
SED # 50-03-04-03-0-007-023
Valley Cottage Elementary School, 26 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-001-016

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.

§ 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.

§ 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.

§ 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:	

SECTION 006300 - REQUESTS FOR INFORMATION (RFI)

PART 1 - GENERAL

1.1 This document is for issuance at the Post Bid/Pre-Construction Conference and specifies administrative and procedural requirements for handling requests for information (RFI's) made after award of Contract.

1.2 Attention is directed to Sections 01 33 00 and 01 32 00 of Division #1 as same concerns construction progress schedules, submittal schedules and submittals of shop drawings, samples and product data in general.

1.3 SUBMITTAL PROCEDURES: RFI's shall be submitted in the following manner:

A. One (1) completed copy of form following to Architect and Construction Manager with copies to Owner (as directed) and appropriate Consultants with the following minimum information:

1. Work identified by RFI listing affected Drawing(s) and specific detail(s) and Specification paragraph reference(s).
2. Identify specific field conditions and "as-built" conditions on sketches attached to RFI submittal.
3. If RFI addresses conflict(s) in, or between, Contract Documents, describe completely and provide such data necessary to permit thorough and proper response by affected discipline.
4. Indicate proposed solution along with any impacts on cost and construction time.
5. Listing of Trade/Specialty Contractors affected by RFI and indication that RFI proposal has been coordinated with said contractors.

INCOMPLETE RFI's WILL BE RETURNED TO CONTRACTOR WITHOUT ACTION TAKEN.

1.4 REVIEW PROCEDURES/ACTIONS

A. Architect/Engineer may request additional information or documentation as may be deemed necessary for fair evaluation of RFI.

B. Architect/Engineer will respond with reasonable promptness as outlined in Section 01 33 00 in writing and may, if deemed appropriate, issue a "Bulletin" as a clarification to the Contract Documents.

End of Section

6 November 2023
Issue for Bid

50-03-04-03-0-004-020
50-03-04-03-0-006-016
50-03-04-03-0-001-016
50-03-04-03-0-007-023

Nyack Union Free School District
District Wide Air Conditioning
- Cafeterias & Global Learning Commons
Nyack Middle School
Liberty Elementary School
Valley Cottage Elementary School
Upper Nyack Elementary School

Date of Request: _____ **RFI NUMBER** _____

Contractor:	**Architect**: KG+D Architects, PC
Address:	**Address**: 285 Main St., Mt. Kisco, NY 10549
Telephone:	**Telephone**: 914.666.5900
Fax:	**Fax**: 914.666.0051
Email:	**Email**: sdirsa@kgdarchitects.com
Project Name:	**Project Location**:

Description, complete with backup data as necessary attached hereto:		
Sketches of Conditions	Spec Reference:	Drawing Reference:
Proposed Solution:		
Cost Impact:	Time Impact:	
Trade/Specialty Contractors Affected:		
Trade/Specialty Contractors Coordinated With:		
Submitted By:		
Architect's Response:		
Response By:	Date of Response:	

6 November 2023
Issue for Bid

50-03-04-03-0-004-020
50-03-04-03-0-006-016
50-03-04-03-0-001-016
50-03-04-03-0-007-023

Nyack Union Free School District
District Wide Air Conditioning
- Cafeterias & Global Learning Commons
Nyack Middle School
Liberty Elementary School
Valley Cottage Elementary School
Upper Nyack Elementary School

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

Nyack UFSD District Wide Air Conditioning, Cafeteria & Global Learning Commons
Nyack Middle School, 98 South Highland Ave.
SED # 50-03-04-03-0-004-016
Liberty Elementary School, 142 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-006-016
Upper Nyack Elementary School, 336 North Broadway, Upper Nyack, NY 10960
SED # 50-03-04-03-0-007-023
Valley Cottage Elementary School, 26 Lake Road, Valley Cottage, NY 10989
SED # 50-03-04-03-0-001-016

THE OWNER:
(Name, legal status and address)

Nyack Union Free School District
13A Dickinson Avenue
Nyack, NY 10960

THE ARCHITECT:
(Name, legal status and address)

KG+D Architects, PC
285 Main Street
Mount Kisco, NY 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.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

TABLE OF ARTICLES

INDEX
(Topics and numbers in bold are Section headings.)

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. 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 a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's 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 the Owner and by Separate Contractors.

§ 1.1.5 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.

§ 1.1.6 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.

§ 1.1.7 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.

§ 1.1.8 Initial Decision Maker

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

§ 1.2 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.

§ 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.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers 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.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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.

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

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 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.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.4 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 repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-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, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the 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 reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. 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.

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 Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, 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 2.3.4, 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 and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the 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.

§ 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 Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the 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, 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 and 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. Unless the Architect 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 Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 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.

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

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants 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 Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 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 provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as 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 knowing 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

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 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 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.

§ 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 of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner 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 a Contractor's construction schedule for the Work. The 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.

§ 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 Architect's approval. The Architect'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 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 perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 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. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work 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 the Work.

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to 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 is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is 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 Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner 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 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 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 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 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 and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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

§ 3.13 Use of Site

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.

§ 3.14 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 or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. 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 may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner 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 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 or Architect. 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.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's 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, 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), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 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.

ARTICLE 4 ARCHITECT

§ 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 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

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

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or 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.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.12 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 partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests 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. 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 a Separate Contractor or the subcontractors of a Separate Contractor.

§ 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 Owner 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 Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner 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 or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner 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.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 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 and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner 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 agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. 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.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. 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 substantially 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 separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 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 and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify 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 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 Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor 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 a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor 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, 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 Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, 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 among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the 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.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 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 Architect 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, 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 Architect 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 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 change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect 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 Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect 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.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

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

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect 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 Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by 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 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, 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 or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 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 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.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor 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 Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, 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 entitled to payment in the amount certified. The foregoing representations 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 Architect. However, the issuance of a Certificate for Payment will not be a representation that the 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 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 Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The 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 previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a Separate Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any 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 Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the 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. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect 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 Architect and Owner 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 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 Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner 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 reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 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 prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect 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 Contractor's 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 to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare 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 adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 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 shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the 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 receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's 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 Architect's final 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 (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.

§ 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 Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 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.

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.

§ 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; and
.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.

§ 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.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 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 and 10.2.1.3. 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 or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. 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 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 and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 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. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor 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 and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor 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.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's 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 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.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act

or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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 Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's 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 Architect has not specifically requested to examine prior to its being covered, the 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 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 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 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 or Architect, the Owner may correct it in accordance with Section 2.5.

§ 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 or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 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.

§ 12.3 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 place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

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

§ 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 Architect timely notice of when and where tests and inspections are to be made so that the 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 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 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 Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If 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 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 Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the 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.

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;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 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 and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 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 or entities 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 and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' 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 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 be certified by the Initial Decision Maker, upon application, 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 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 the 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.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, 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, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 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.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. 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.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 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 reasons therefor; and (3) notify the parties 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 after 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.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SECTION 007002 - INSURANCE RIDER

(Supplement to Article 11 of Section 007000, AIA A201-2017
For Insurance Requirements for this Project)

Name of Insurance Producer:	
Name of Insured:	

The Contractor shall purchase and maintain during the life of the contract insurances as listed herein. This insurance must be purchased from a New York State licensed, A.M. Best Rated "A" or "A+" carrier. The Owner, the Architect, their Consultants and Subconsultants shall, with the exception of Worker's Compensation and Employer's Liability Insurance, be named as additional named insureds on a primary and non-contributory basis. Contractor must submit additional insured endorsements to the District for approval.

At least ten (10) working days prior to the commencement of the Work, the Contractor and all Subcontractors shall submit to the Owner, through the Architect, a Certificate of Insurance (AIA Form G705) or Accord 25-s showing evidence of insurance coverage as required by these documents. The standard Accord Form of Certificate of Insurance or insurance carrier certificate will be acceptable for employer's liability and statutory Disability. Submit all Workers' Compensation Certificates on form C-105.2, or if funded though the New York State Insurance Fund, on form U-26.3.

All Certificates of Insurance must be signed by a licensed agent or authorized representative of the insurance carrier.

The certificate shall be issued to the Owner with a provision that in the event the policies are either canceled or diminished, at least 30 days prior notice thereof shall be given to the Owner.

The insurance required for this project shall be written for not less than limits of liability specified in this attachment or otherwise within the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

.1 General Liability: (Occurrence Form) – Limits Per Project using ISO Form CG 00 01 07 98 or later date

$2,000,000	General Aggregate
$2,000,000	Products/Completed Operations
$1,000,000	Personal and Adv. Injury
$1,000,000	Occurrence
$ 100,000	Fire Damage
$ 10,000	Medical Expense

Coverage to include Broad Form Property Damage, Contractual Liability, Independent Contractors, and Personal Injury. No exclusion for XCU or hazards shall be endorsed to the Policy.
Products and Completed Operations Coverage to be kept in force for 12 months after final payment; a renewal certificate is to be submitted for the project if the coverage renews in less than 12 months following the completion of the project.
Coordinate requirements for additional insurance covering contractual obligations assumed by Contractor as established in Articles 3.18 and 10.3 of these Conditions by using Endorsement ISO Form B, CG 20 37 or CG 20 38. This endorsement must also reflect that the coverage provided is Primary and Non-Contributory. Waiver of Subrogation applies to all policies for all
additional insureds.

.2 Auto Liability to cover ALL autos; or Owned, Hired, Leased and Non-Owned Autos.

$1,000,000	Combined Single Limit or
$ 500,000	Bodily injury (per person)
$1,000,000	Bodily injury (per accident)
$ 500,000	Property Damage
$ 5,000	Medical Payments

.3 Excess Liability: Insurance is to cover all stated insurance coverages listed within this Attachment

$2,000,000	Each Occurrence
$2,000,000	Aggregate
$ 10,000	Retention (Maximum)

.4 Workers' Compensation

Statutory	Part A
Statutory	Disability
Employer's Liability	Part B
$ 500,000	Each Accident
$1,000,000	Disease Policy Limit
$ 500,000	Disease Each Employee

.5 Hazardous Material Coverage

Hazardous material liability insurance as follows:	$1,000,000 occurrence/$2,000,000 aggregate, including products and completed operations.
Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract.	

If motor vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948) as well as proof of M CS 90.
Coverage shall fulfill all requirements of the Contract and General Conditions and shall extend for a period of three (3) years following acceptance by the Owner of the Certificate of Completion.

.6 Testing Company Errors and Omission Insurance

$1,000,000	Each Occurrence
$2,000,000	Aggregate

for the testing and other professional acts of the Contractor performed under the contract with the Owner.

Further, Contractor shall require all Subcontractors to carry similar insurance coverages and limits of liability as set forth above and adjusted to the nature of Subcontractors' operations and submit same to Owner for approval prior to start of any Work.

Further, it is not the intention of these insurance requirements to require each Subcontractor, vendor or material man involved in the work to provide “excess” coverage in the amounts stated herein but the “excess” limit shall be at least 2 times the contract sum entered into between the individual Contractor and the particular Subcontractor, vendor or material man but not less than $1,000,000.00, each occurrence, $3,000,000 aggregate and $10,000 retention (Maximum).

In the event Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend and hold harmless Owner, Architect, Engineers, Consultants and Subconsultants and their agents or employees from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.
The following shall be included as Additional Insured:

School District (NAME), Members of the Board of Education, any officer, member of its staff, employee, or representative of school district. KG+D Architects and ALL consultants listed on the cover of the PROJECT/SPECIFICATIONS MANUAL

Proof of Insurance shall show the following Insureds and Holder:		
(a)	Certificate Holder:	
(b)	Additional Named Insureds, on a primary basis:	
	Owner	
	Architect	
	Construction Manager (if applicable)	
	Consultants:	

NYACK PUBLIC SCHOOLS

13A Dickinson Avenue - Nyack - NY - 10960

INSURANCE AGREEMENT –CONTRACTOR

I. Notwithstanding any terms, conditions or provisions, in any other writing between the parties, the contractor hereby agrees to effectuate the naming of the District as an additional insured on the contractor's insurance policies, with the exception of workers' compensation and N.Y. State disability insurance.

II. The policy naming the district as an additional insured shall:

- Be an insurance policy from an A.M. Best A-rated or better insurer, licensed to conduct business in New York State. A New York licensed and admitted insurer is strongly preferred. The decision to accept non-licensed and non-admitted carriers lies exclusively with the District.
- State that the organization's coverage shall be primary and non-contributory coverage for the District, its Board, employees and volunteers.
- Additional Insured status must be provided to the District by standard or other endorsements that extend coverage to the District for on-going operations (CG 20 38) and products and completed operations (CG 20 37). The decision to accept an endorsement rests solely with the District. A completed copy of the endorsements must be attached to the Certificate of Insurance.

III. Certificates of Insurance

- The certificate of insurance must describe the specific services provided (e.g., telephone systems maintenance and installation, carpentry, roofing, plumbing, electrical) covered by the commercial general liability policy and the umbrella policy. *Such policies must also provide coverage for claims of negligent hiring, training, and supervision and which may arise in the context of sexual molestation, abuse, harassment, or similar sexual misconduct; sub-limits below policy limits for such coverage are acceptable solely at the discretion of the District.*
- A copy of the declaration page of the liability and umbrella policies with a list of endorsements and forms shall be provided to the District upon request.
- A fully completed New York Construction Certificate of Liability Insurance Addendum (ACORD 855 2014/2015) must be included with the certificates of insurance. Additional detail must be provided for each 'YES' answer to Items G through L of this form.

III. The contractor agrees to indemnify the district for any applicable deductibles and self-insured retentions.

IV. Minimum Required Insurance: Insurance coverage as indicated must be obtained and kept in force:

a. **Commercial General Liability Insurance**
   $1,000,000 per occurrence/ $2,000,000 Aggregate
   $2,000,000 Products and Completed Operations
   $1,000,000 Personal and Advertising Injury
   $100,000 Fire Damage
   $10,000 Medical Expense
   The general aggregate shall apply on a per-project basis.

b. **Automobile Liability**
   $1,000,000 combined single limit for owned, hired and borrowed and non-owned motor vehicles.

c. **Workers' Compensation, Employers Liability**
   Statutory Workers' Compensation (C-105.2, U-26.3) and NYS Disability Insurance (DB-120.1) for all employees. 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. A person seeking exemption must file a CE-200 Form with the state. This form can be completed and submitted directly to the WC Board online.

d. **Umbrella/Excess Insurance:** coverage shall be on a follow-form basis
   $2,000,000 each Occurrence and $2,000,000. Aggregate for general construction and no work at elevation (1 story = 10 feet) and project values less than or equal to $10,000.

$5,000,000 each Occurrence and Aggregate for general construction and no work at elevation (1 story = 10 feet) or project values greater than $10,000 and less than or equal to 1,000,000.

$10,000,000 each Occurrence and Aggregate for high risk construction, work at elevation (>1 story or 10 feet) or project values greater than $1,000,000.

e. **Owners Contractors Protective (OCP) Insurance**
For projects greater than $250,000 and less than or equal to $1,000,000 and work on 1 story (<=10 feet) only: $1 million per occurrence, $2 million aggregate with the District as the Named Insured.
For projects greater than $1,000,000 and/or work over 1 story (>10 feet); $2 million per occurrence: $4 million aggregate with the District as the Named Insured.
For all projects where General Liability, Auto and Umbrella/Excess Coverage is with non-licensed and non-admitted carriers in New York State: $2 million per occurrence, $4 million aggregate with the District as the named Insured.

The District will be the Named Insured on OCP Policies. There will be no Additional Insureds on any OCP Policies. The OCP Policies will be written by NYS Licensed and Admitted Carriers.

f. **Builder's *Risk (when required)***
Must be purchased by the contractor to include interest of the Owner and Contractor jointly in a form satisfactory to the owner. The limit must 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.

V. Sub-contractors are subject to the same terms and conditions as stated above and must submit same to the District for approval prior to the start of any work.

VI. In the event the Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend, and hold harmless the District, its Board, employees and volunteers 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.

VII. Contractor acknowledges that failure by Contractor to obtain such insurance on behalf of the District constitutes a material breach of contract and subjects it to liability for damages, indemnification and all other legal remedies available to the District. The contractor is to provide the District with a certificate of insurance, evidencing the above requirements have been met, prior to the commencement of work.

Representative Name (Print):_____

Authorized Signature: _____

Company Name: _____

Title: _____

Phone: _____

Email: _____

Date: _____

ADDITIONAL REQUIREMENTS ASBESTOS, LEAD ABATEMENT AND/OR HAZARDOUS MATERIALS

Asbestos/Lead Abatement Insurance
$2,000,000 per occurrence/$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement, enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract.

If the Contractor is using motor vehicles for transporting hazardous materials, the Contractor shall maintain pollution liability broadened coverage (ISO Endorsement CA 9948), as well as proof of MCS 90. Coverage shall fulfill all requirements of these specifications and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.

Testing Company Errors and Omission Insurance
$1,000,000 per occurrence/$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the District.

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

SECTION 011000 - DESCRIPTION OF WORK

1.1 GENERAL PROJECT DESCRIPTION

A. The scope of work of this project generally consists of interior renovations at Nyack Middle School, Liberty Elementary School, Valley Cottage Elementary School, and Upper Nyack Elementary School, all as depicted on the accompanying Contract Drawings; the Technical Specifications and the general outline of work as described in “B” below.

B. INTERIOR ALTERATION
Location: Nyack Middle School
Scope: Air Conditioning in Cafeteria

Location: Liberty Elementary School
Scope: Air Conditioning in Cafeteria and Global Learning Commons

Location: Valley Cottage Elementary School
Scope: Air Conditioning in Cafeteria and Global Learning Commons

Location: Upper Nyack Elementary School
Scope: Air Conditioning in Cafeteria and Global Learning Commons

C. Bids shall be received in accordance with the New York State Public Bidding Laws; this project will be executed under MULTIPLE PRIME CONTRACTS as noted in the “Special Instructions to Bidders.”

D. Scope Statement - For purposes of establishing the specific items of Work a listing of the "general scope" is included IN “B” above.

This “scope” listing is to be considered as for information only; failure to list any item of work therein required to complete the Work will not relieve any Contractor from providing that work and all ancillary items necessary to complete same in accordance with the Contract Documents.

The general items of work applicable to the Project are included in the companion Technical Specifications and as depicted on the accompanying Contract Drawings.

The accompanying Technical Specifications establish all governing requirements set forth in Part 1 as well as supplemental general items of Scope; Part 2, for all material requirements and Part 3, for all execution and workmanship requirements.

E. 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 visit the site and verify all existing conditions.

F. The Contractor's attention is directed to Articles 6.1.4 through 6.2.1.2 of Section 007000, which require coordination of this Contractor's work with the work and progress of other separate contracts.

G. SECURITY PROVISIONS
1. All Contractors' employees shall use a single means of access and egress, except in the case of emergency, to be designated by the General Contractor.
2. Each Contractor and each Subcontractor shall require his employees, while on the job site, to wear, in a conspicuous location, a Photo I.D. badge bearing the name of the individual and the Contractor for whom working. The badges of each Contractor shall be numbered consecutively. An up- to-date list of all I.D. badges, indicating the name and number along with a copy of the photograph for each employee, shall be furnished to the Owner.

H. Regarding special inspections, the registered design professional in responsible charge shall be the Architect. The Owner shall hire the special inspectors and shall be responsible for the cost of special inspections, but the Contractor is responsible for the cost of any re-inspections or retesting. The inspections required are outlined on the Statement of Special Inspection and Tests Form (attached). The Architect shall be responsible for determining the qualifications of the special inspectors, receiving and retaining all reports and assuring that any discrepancies are corrected.

Special inspectors must keep records of inspections and furnish inspection reports to the Architect of record. The reports must indicate that the work inspected was done in conformance with the approved construction documents. Discrepancies must be brought to the attention of the Contractor and non-corrected discrepancies must be brought to the attention of the Architect of record. A final report of inspections documenting required special inspections and correction of any discrepancies noted must be submitted to the registered design professional in responsible charge at the completion of the project. The design professional shall forward a copy of the final report to the Owner for its records.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION
A. Asbestos and lead paint awareness requirements
B. Construction time and phasing requirements
C. Proof of orders and delivery dates
D. Intent of Documents
E. Field Measurements
F. Initial Submittal Requirements
G. Quality Requirements
H. Manufacturer’s Field Services and Reports
I. Coordination
J. Schedules and Milestones
K. Additional Requirements
L. Waste Management Procedures and Definitions
M. Use of Premises

N. Owner Occupancy Requirements
O. Payrolls and Payroll Records – Coordinate with Sections 012900, 012901 and 017700

1.3 ASBESTOS AND LEAD PAINT AWARENESS REQUIREMENTS

A. Contractor agrees not to use or permit the use of any asbestos containing material in or on any property belonging to the Owner.
B. For purposes of this requirement, asbestos free shall mean free from all forms of asbestos including - actinolite, amosite, anthrophyhllite, chrysotile, cricidolite and tremolite both in friable and non-friable states and without regard to the purposes for which such material is used.
C. Contractor agrees not to use or permit the use of any lead paint or lead paint containing material in or on property belonging to Owner

1.4 CONSTRUCTION TIME AND PHASING REQUIREMENTS

A. The Contractor is advised the "time is of the essence" of the Contract as defined in Article 8 of the "General Conditions". Further, safe and legal ingress and egress shall be maintained at all times to and through the occupied portions of the construction site. Attention is directed to Article 3.13 of Section 007000 for use of site, temporary new work and maintenance of legal egress at all times.
B. Work shall proceed in such a manner as to cause the least amount of disruption to the ongoing operations as possible. COORDINATE CLOSELY WITH SCHOOL OPERATING PERSONNEL.
C. No person shall cause, suffer, allow or permit unreasonable noise to be made. For the purposes of this article, unreasonable noise includes but is not limited to the following acts:
    1. Construction activities that can be heard over any property line except in the case of public safety or a public emergency or during the following hours
        a. Monday through Friday, excluding holidays, during the hours of 8:00 AM to 6:00 PM
        b. Saturdays during the hours of 10:00 AM to 5:00 PM
    2. Blasting, jack-hammering, pile-driving and rock crushing except Monday through Friday, excluding holidays, during the hours of 9:00 AM to 5:00 PM

D. All work and storage areas shall be completely enclosed by a fence or barricade at all times so that no student or the public can approach the area or the equipment. The Contractor shall maintain fences and barricades at all times and shall -
    ° Provide signs posted on fence 50 feet on center that read "Work Area - Keep Out".
    ° Maintain at all times, all exits and walkways from the Building.

    Where the barricade is removed for work, the Contractor performing such work shall provide adequate safety personnel to prevent unauthorized persons from approaching the work area.
    1. The Contractor is advised that areas of the existing buildings which are to be added to and/or altered under this Contract will remain in use during construction, coordinate with Section 015000 for temporary facilities.

2. Electrical and mechanical services to functioning spaces shall be maintained at all times.
3. The Contractor shall provide and maintain all required separations between old and new construction to prevent:
   a. Entrance to construction areas by unauthorized individuals.

1.5 PROOF OF ORDERS AND DELIVERY DATES - Coordinate with Sections 013300 and 013200.

A. Within 2 weeks after the approval of shop drawings, samples, product data and the like, the Contractor shall provide copies of purchase orders for all equipment and materials which are not available in local stock. The Contractor shall submit written statements from suppliers confirming the orders and stating promised delivery dates.

B. This information shall be incorporated within the progress schedules so required as part of Section 013200 and shall be monitored so as to insure compliance with promised dates.

1.6 INTENT OF DOCUMENTS - See Article 1, Subparagraph 1.2.1 of Section 007000 for resolution of conflicts between drawings and specifications.

Regardless of hierarchy listed in reference paragraph, in cases of conflict as to the type or quality of materials to be supplied, the Specifications shall govern.

1.7 FIELD MEASUREMENTS

A. Each Respective Contractor shall take all necessary field measurements prior to fabrication and installation of work and shall assume complete responsibility for accuracy of same.

B. For the portions of this project that are ALTERATIONS, additional attention to existing conditions is necessary whether or not so required by each technical section.

1.8 INITIAL SUBMITTAL REQUIREMENTS

A. As outlined in Sections 005000, 007000, 013300, 013200 and 015000 Contractor shall provide items noted including - bonds, insurance, emergency telephone numbers, progress scheduling, schedules of submittals, subcontractor listings, and the like prior to the start of any work.

B. Schedule of Values
   1. Submit schedule on AIA Form G703.
   2. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement or as established in Notice to Proceed, whichever is earliest.

1.9 QUALITY REQUIREMENTS

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturer's instructions.

C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher

standards or more precise workmanship.

D. Monitor fabrication and installation tolerance control of installed products over suppliers, manufacturers, products, site conditions, and workmanship, to produce acceptable Work. Do not permit tolerances to accumulate.

E. Comply fully with manufacturer's tolerances.

1.10 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to furnish qualified staff personnel to observe site conditions and to initiate instructions when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturer's written instructions.

1.11 COORDINATION

A. Coordinate scheduling, submittals, and Work of various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.

C. Coordinate space requirements of work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.

1.12 SCHEDULES AND MILESTONES

A. General

1. The objective of this project is to complete the overall work in the shortest period of time and to protect the building and occupants from damages caused by weather and construction activity during the progress of the work.
2. To meet these objectives, the Contractor shall plan the work, obtain materials, and execute the construction on the most expeditious manner possible in accordance with the requirements listed below.
3. If the Contractor fails to expedite and pursue any part of the work, the Owner may terminate the contract as per Article 14.2 or may carry out the work as per Article 2.4 of the General Conditions.
4. The Contractor shall work in coordination with work of other Contractors and with school activities with special attention to noise, dust, safety and other contract requirements for work in and around the occupied building.

B. Work Period and Milestones

1. Mobilization: January 8, 2024
2. Substantial Completion Phase 1 (alternate): August 30, 2024
3. Substantial Completion Phase 2: August 29, 2025
4. Final Completion: November 28, 2025

1.13 ADDITIONAL REQUIREMENTS

A. If it appears that some of the work cannot be completed by the scheduled date, the Contractor shall increase the work force or increase the hours of work, including evenings and weekends as necessary, at no additional cost to the Owner. If the work is complete but the area is not cleaned and debris or equipment is not removed, the Owner shall have the right to prepare the area for occupancy with his own forces and deduct the costs from the Contract Sum.

B. If the Contractor fails to staff the job adequately to meet the completion date, the Owner reserves the right to assume possession of the material and complete installation with the Owner's forces or other Contractors or to require the Contractor to work evenings and weekends.

C. The school can be made available on weekends and evenings to allow the Contractor adequate time to complete the work before final completion date. Any custodial cost resulting in this after-hours scheduling will be the Contractor's responsibility.

D. In addition to the above-stated requirements for phasing of the work, the Contractors shall not do any noisy work in the areas where examinations will be conducted as per the published school calendar.

E. The Contractor is responsible for temporary protection of all work until acceptance.

F. The school will be closed on Saturdays, Sundays, regularly scheduled Owner holidays, and at night after cleaning crews have finished. If any Contractor wishes to work at any time when the school is normally closed, that Contractor shall arrange and pay for custodial services for the building at the applicable Owner pay rates.

1.14 MOLD MITIGATION REQUIREMENTS (As applicable to Project Construction)

A. All return air ductwork and all exhaust air ductwork be sealed tight with mastic.

B. Do not allow open plenum returns above dropped ceilings unless the plenum is sealed tightly with respect to the exterior walls and roof.

C. The buildings HVAC system shall not be operated during construction.

D. All gypsum wallboard be installed with a fire sealant bead of 3/8 in. (9 mm) between the floor and the bottom edge of the gypsum, coordinate with Sections 078400 and 092900.

E. The moisture content (or water vapor emission rate) of all concrete block walls be measured and documented by the general contractor, and that no gypsum board be hung on those walls until the moisture content of the blocks in the wall measures the same as the identical type of block that has been stored away from any rain exposure, coordinate with Sections 042000 and 092900.

F. The moisture content of the taped and sanded gypsum board walls be measured and documented by the general contractor at two locations on each wall: the bottom edge and halfway between floor and ceiling. Interior finish may not be applied until the moisture content of the wallboard is below 0.4% on a gypsum moisture meter or below 12% on a wood meter, coordinate with Division 9 sections as applicable.

G. The moisture content of the concrete floor slab shall be measured as soon as the building has been closed in and as soon as the slab temperature can be brought within the 65°F to 75°F (18.3°C to 23.9°C) temperature required for the measurement. If the moisture content is excessive, the air above the concrete shall be held below 30% relative humidity until the material is dry enough to meet the

specification established by the respective flooring manufacturers, coordinate with Division 9 sections as applicable.

H. Attention is directed to Sections 062000, 095100 and 099000 for temperature and humidity restrictions prior to start of work and maintenance of work conditions.

1.15 WASTE MANAGEMENT PROCEDURES AND DEFINITIONS

A. Waste Management Definitions

1. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
2. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
3. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitability, corrosivity, toxicity or reactivity.
4. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitability, corrosivity, toxicity, or reactivity.
5. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
6. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
7. Recycle: To remove a waste material from the Project site to another site for remanufacture into a new product for reuse by others.
8. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
9. Return: To give back reusable items or unused products to vendors for credit.
10. Reuse: To reuse a construction waste material in some manner on the Project site.
11. Salvage: To remove a waste material from the Project site to another site for resale or reuse by others.
12. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
13. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
14. Toxic: Poisonous to humans either immediately or after a long period of exposure.
15. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
16. Volatile Organic Compounds (VOCs): Chemical compounds common in and emitted by many building products over time through outgassing including - solvents in paints and other coatings; wood preservatives; strippers and household cleaners; adhesives in particleboard, fiberboard, and some plywoods; and foam insulation.
17. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable,

and reusable material.

18. Waste Management Plan: A Project-related plan for the collection, transportation, and disposal of the waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material being landfilled.

1.16 USE OF PREMISES

A. Use of Buildings and Sites:

1. Limits: Confine constructions operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated. All areas of the site with the exception of the project area where the Work is being performed are off limits to Contractor and his employees.
2. Owner Occupancy: Allow for Owner occupancy of adjacent buildings and sites and use by the public. Conduct the Work to provide the least possible interference to the activities of the Owner's personnel and use of the buildings and sites by the public.
3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to emergency vehicles at all times. Coordinate accessibility and closure of entrances serving premises with Owner and Owner's employees Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances.
   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 Owner's Representative and/or the Construction Manager.
4. Damages: Promptly repair damages caused to adjacent facilities by work of the Contract to a good-as-new condition acceptable to the Owner.
5. Existing Facilities: The following facilities are specifically noted as **not** to be used by Contractor or his employees:
   a. Toilet facilities
   b. Food service facilities, including kitchen and dining areas
   c. Telephones
6. Utility Shutdowns: Coordinate all utility shut downs and cross overs with the Owner's Representative and Construction Manager, schedule during off hours and non-occupied times only.

1.17 OWNER OCCUPANCY REQUIREMENTS

A. Owner will occupy site and existing buildings 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 operations. Occupancy level will be reduced during summer months when school is not in session. Coordinate with Construction Manager for schedule of working hours and work restrictions during period when school is in session.

B. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy. Obtain a Certificate

of Occupancy from authorities having jurisdiction before Owner occupancy.

C. Comply with standards for construction projects as follows and as stated in Article 3.13 of Section 00 70 00:
   1. Interaction with employees 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.

1.18 PAYROLLS AND PAYROLL RECORDS – See Section 012900

A. In accordance with Article 8, Section 220 of the New York State Labor Law and applicable Article in the General Conditions (Section 00 70 00), 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:
   1. Name
   2. Classification(s) in which the worker was employed
   3. Hourly wage rate(s) paid
   4. Supplements paid or provided
   5. Daily and weekly number of hours worked in each classification.

B. 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.

End of Section

SECTION 011500 - SPECIAL PROJECT REQUIREMENTS

Excerpts from 8 NYCRR Section 155.5 as they address "General Safety and Security Standards for Construction Projects".

STATEMENT OF PURPOSE: "The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy"

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the Conditions of the Contract and the balance of Division #1 and Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. All contractors, subcontractors, Sub-subcontractors, vendors and the like shall monitor their workers and require that they adhere to the following safety provisions during all construction and maintenance activities for the duration of the project.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION AS APPLICABLE TO THE PARTICULAR PROJECT SCOPE OF WORK

A. Safe and Secure Storage of Construction Materials
B. Fencing – Project; Material storage areas; Container/Refuse areas
C. Gates – Manned during working hours; locked and secure off hours.
D. Sidewalk bridges, security barriers, etc. reference "Exterior Renovations"
E. Worker identification system
F. Temporary partitions – separation of construction areas from occupied spaces; construction, materials, inspection and maintenance.
G. Worker access both horizontal and vertical in occupied buildings
H. Debris removal.
I. Ventilation of work spaces
J. Exiting
K. Fire and hazard prevention
L. No Smoking
M. Fire extinguishers
N. Temporary sprinklers (if any)
O. Smoke detectors (temporary)
P. Fire watch and maintenance of existing fire alarm systems
Q. Storage of gas and welding equipment
R. Noise abatement procedures
S. Construction fume controls
T. Off-Gassing/bake out procedures
U. Material Safety Data Sheet log
V. Asbestos Code Rule 56
W. Asbestos TEM

X. Lead Abatement/Lead paint
Y. Indoor Air Quality

1.3 SAFE AND SECURE STORAGE OF CONSTRUCTION MATERIALS – Coordinate with Sections 015000 and 016100 each as included with these documents.

A. Materials stored on the Site shall be neatly arranged and protected, and shall be stored in an orderly fashion in locations that shall not interfere with the progress of the Work.

NOTE: If approval is given to store materials in any part of the building area, they shall be so stored as to cause no overloading of the structure.

N

1.04 FE CING – PROJECT; MATERIAL STORAGE AREAS; CONTAINER/REFUSE AREAS – Coordinate with Section 015000

A. Barrier fencing constructed as outlined in Section 015000 shall be provided surrounding all work areas, material storage locations and around dumpsters and/or chutes when involved with demolition/removal operations.
B. Fencing shall be maintained in good sound condition throughout the entire course of construction by the Owner's Representative and/or Contractor and removed only when directed by the Architect and/or Owner's Representative.

1.5 GATES

A. Gates in construction fencing shall be of construction outlined in Section 015000 and shall be under either the Owner's Representative or Contractors' supervision throughout the work day and shall be secured in a locked condition at the close of any single business day and on all non work days. Gates shall be manned at all times work is in progress.

1.6 SIDEWALK BRIDGES, SECURITY BARRIERS, ETC. REFERENCE "EXTERIOR RENOVATIONS"

A. As applicable to the project involved, provide overhead protective devices for the work consisting of tubular framed scaffold bridges, joist trusses and solid decking. Provide guard rails, lights and warning signs.

1.7 WORKER IDENTIFICATION SYSTEM – Coordinate with Section 011000, Article 1.01.

A. All Contractors' employees shall use a single means of access and egress, except in the case of emergency, to be designated by the General Contractor.
B. The Contractor shall, for all work covered under the Contract, establish a security control system for personnel and material involved with the work herein.
C. The control system shall include photo identification badges and the like so as to insure against unauthorized entry to the site and resultant entry to the building proper.

1.8 TEMPORARY PARTITIONS – SEPARATION OF CONSTRUCTION AREAS FROM OCCUPIED SPACES; CONSTRUCTION, MATERIALS, INSPECTION AND MAINTENANCE – Coordinate with Section 015000 as applicable to project type.

A. Provide temporary partitions from floors to underside of structure above, in sash and any other openings created by new construction, additions and alterations.
B. **Such partitions shall be constructed dust-tight using steel studs and acoustically and/or thermally insulated, Level 1 taped fire rated gypsum board as specified in Section 092900.**
C. Locate enclosures as directed by the Architect and/or as shown on the drawings.
D. In addition to partitions and closures, provide tight fitting filters over all return air grilles and/or open ducts in order to properly protect central air handling equipment.
E. Take all necessary precautions to avoid unnecessary dust spreading to adjoining rooms and spaces.
F. Keep all doors to spaces closed and provide positive seals around cracks, frames, doors and other openings within work areas.
G. WHERE EXTERIOR CLOSURES ARE REQUIRED, INSULATE SAME TO MAINTAIN A TEMPERATURE OF SIXTY-FIVE (65) DEGREES F. WITHIN THE PLANT WITHOUT THE USE OF SPECIAL HEATING EQUIPMENT.
H. All temporary enclosures/partitions/containment barriers shall be periodically inspected and maintained in good repair so as to prevent exposure to dust and contaminants outside the work and/or containment areas.

1.9 WORKER ACCESS BOTH HORIZONTAL AND VERTICAL IN OCCUPIED BUILDINGS
A. A specific stairwell and/or elevator shall be assigned for construction worker use during work hours. Workers may not use corridors, stairs or elevators designated for students or school staff.

1.10 DEBRIS REMOVAL – Coordinate with Sections 015000, 017700 and 024119/20.
A. Large amounts of debris must be removed by use of enclosed chutes or similar systems. There shall be no movement of debris through corridors of occupied spaces of the building. No materials shall be dropped or thrown outside the walls of the building.
B. All occupied parts of the building or buildings affected by renovation activity shall be cleaned at the close of each work day.
C. School buildings occupied during any construction period shall maintain required health, safety and educational capabilities at all times that classes are in session.

1.11 VENTILATION OF WORK SPACES
A. The General Contractor shall provide indoor air quality management as follows:
1. Provide at exhaust air system for the project indoor areas which could produce fumes, VOC's off-gasses, gasses, dusts, mists, or other emissions both during construction activities ***and*** during required curing periods, coordinate with manufacturer's requirements for all materials used.
2. Exhaust air system for the project areas which could produce emissions listed in Paragraph 1 shall be utilized. Work area exhaust shall terminate at the building exterior.
3. Provide temporary partitions and air seals to prevent the migration of

airborne contaminants from unoccupied areas to occupied areas when applicable.

4. Quality assurance:
   a. Maintain a negative pressure between the work area and the space surrounding the work area.
   b. Before start of work, submit a design for the exhaust air system. Do not begin work until approval of the Construction Manager is obtained. The design shall include, but not be limited to:
      1. The number of machine required.
      2. Location of the machines in the work space.
      3. Description of the methods used to test air flow and pressure differential.
5. System operation:
   a. A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated in accordance with the following standards:

      Provide one work place air change every 15 minutes.

      To calculate total air flow requirements:

      $$\frac{\text{TOTAL FT/3MIN – VOLUME OF WORK AREA (IN FT3)}}{\text{15 MINUTES}}$$

      To calculate the number of units needed for the work area.

      $$\frac{\text{NUMBER OF UNITS NEEDED – TOTAL FT3/MIN}}{\text{(CAPACITY OF UNIT IN FT3/MIN)}}$$

   b. Exhaust air system shall operate for a minimum of 72 hours after work is completed, or until all materials have cured sufficiently as to stop out gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
   c. Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.
6. **During reroofing operations, air intakes shall be "shut-down" or made safe in other approved manners.**

B. The HVAC Specialty Contractor is to be completely responsible for maintaining all required ventilation in the occupied areas of the building during construction as follows:
   1. Prior to construction, the HVAC Specialty contractor will examine the existing ductwork in the occupied areas of the building.
   2. The layout of existing ductwork is shown, to the extent that it was originally documented, on the HVAC drawings.
   3. The HVAC Specialty contractor will reroute, disconnect or cap nay duct,

which because of its proximity to the construction area, may carry contaminants from the construction area to the occupied area.

4. This alteration of the existing ventilation system must prevent contaminants from entering the occupied areas, but must not prevent the maintenance of necessary ventilation in the occupied area.

Additionally, as the HVAC Specialty contractor provides and connects new ductwork it will continue to evaluate the effect of such ducts and connections on contaminant migration. It will reroute, disconnect or cap this ductwork as needed to prevent contaminants from the construction area from entering the occupied section of the building.

At each point in the construction where such evaluation and rerouting, disconnecting or capping is required, the HVAC Specialty contractor will confer with the Architect and Construction Manager (as appropriate) in determining its course of action and will obtain the Architect's approval prior to executing this work."

1.12 EXITING

A. At all times, the General Contractor is responsible for maintenance of safety and egress requirements from work areas.

NOTE: All legal forms of egress must be maintained at all times.

B. Provide temporary exit passage system(s) with guard and hand rails and ramps and such other measures indicated on the drawings and as specified.

1.13 FIRE AND HAZARD PREVENTION – See Section 015000 for requirements for fire watches, storage and maintenance of welding gasses and temporary heating and the like.

1.14 NO SMOKING – No smoking is permitted on the grounds or within the construction area of any project.

1.15 FIRE EXTINGUISHERS – Fire extinguishers shall be provided within the work area and shall be monitored on a scheduled maintenance basis and so tagged to indicate same.

1.16 TEMPORARY SPRINKLERS (IF ANY) – See Section 015000 for applicable text and requirements.

1.17 SMOKE DETECTORS – The Electrical contractor shall provide a temporary battery powered smoke detection system for all areas under construction.

1.18 FIRE WATCH AND MAINTENANCE OF EXISTING FIRE ALARM SYSTEMS – See Section 015000

A. All Contractors shall comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to the work and,

particularly, in connection with any cutting or welding performed as part of the work.

B. During welding or cutting operations, a contractor's man shall act as a fire watcher. The fire watcher shall have proper eye protection and suitable fire fighting equipment including fire extinguisher (bearing current inspection Certificate), protective gloves and any other equipment deemed necessary.

C. The Electrical Specialty Contractor will provide for and maintain the proper operation of fire alarm and smoke detection systems in all areas throughout the course of the project. The Electrical Specialty Contractor will provide all labor and material required to accomplish this in occupied areas of the school buildings and in areas under construction.

1.19 STORAGE OF GAS AND WELDING EQUIPMENT – See Section 015000 for specific requirements and controls.

1.20 NOISE ABATEMENT PROCEDURES

A. Develop and maintain a noise abatement program and enforce strict discipline over all personnel to keep noise to a minimum. Equipment and work shall not produce noise in excess of 60db in occupied areas or shall be scheduled for off hours or acoustical abatement procedures shall be taken. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of the noise.

B. Execute construction work by methods and by use of equipment which will reduce excess noise.

C. Equip air compressors with silencers, and power equipment with mufflers.

D. As established in Section 011000, all contractors shall abide by the “no work” periods designated by the Owner.

1.21 CONSTRUCTION FUME CONTROLS – See Article 1.11 herein.

1.22 OFF-GASSING/BAKE OUT PROCEDURES – See Section 017700

A. Heat all areas of new construction to 95 degrees for a minimum of 72 hours.

B. At the end of this period ventilate area with 100 percent outside air and exhaust air for a minimum of 24 hours to eliminate off gassing that occurs during bake out period.

C. Change all air filters upon completion.

D. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which “off-gas” chemical fumes, gases, or other contaminants shall be aired out in well-ventilated heated warehouse before they are brought to the project for installation or the manufacturer’s recommended “off-gassing” periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or “off-gas” before re-occupancy.

1.23 MATERIAL SAFETY DATA SHEET LOG – Coordinate with Section 013300

A. Contractor shall maintain "MSDS" file on site, accessible to workers and otherwise in compliance with jurisdiction's "Right To Know" legislation.

B. The submittal of the required MSDS information shall be segregated from the required material/shop drawing/sample submittals in a separate binder and not co-mingled with the technical submittals, failure to so conform will be cause for rejection of any submittal.

1.24 ASBESTOS CODE RULE 56 AND ASBESTOS CONTAMINATED MATERIALS (ACM)

A. Abatement projects as defined by Rule 56 shall not be performed while the building is occupied.

B. In the event asbestos-contaminated materials are encountered during the work Contractor shall immediately notify the Architect and/or Owner for instructions as to procedures to be taken.

C. All asbestos abatement projects shall comply with all applicable federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56(12 NYCRR 56), and the federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, New York 12234). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations.

1.25 LEAD ABATEMENT/LEAD PAINT

A. In the event lead based paint is encountered during the work Contractor shall immediately notify the Architect and/or Owner for instructions as to procedures to be taken.

B. Attention is directed to technical Section 099100 for “protocols” concerning lead paint removals and preparation.

C. Any construction or maintenance operations which will disturb lead based paint shall be abated pursuant to protocols detailed in the “Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing” (June 1995; U.S. Department of Housing and Urban Development, Washington, DC 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). All areas scheduled for construction as well as areas of flaking and peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

End of Section

SECTION 012500 - PRODUCT OPTIONS AND SUBSTITUTIONS

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the Conditions of the Contract and the balance of Division #1 and Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Approved Equal Clause
B. Substitution Requests
C. Options
D. Contractor's Representation
E. Reimbursements

1.3 APPROVED EQUAL CLAUSE

A. Throughout the Specifications, types of material may be specified by manufacturer's name and catalog number in order to establish standards of quality and performance and not for the purpose of limiting competition.

Inclusion by name, of more than one manufacturer or fabricator, does NOT necessarily imply acceptability of standard products of those named. All manufacturers, named or proposed, shall conform, with modification as necessary, to criteria established by Contract Documents for performance, efficiency, materials and special accessories.

B. Contractor may assume the phrase "or approved equal" except that the burden is upon the Contractor to prove such equality and to satisfy Architect that proposed substitute is equal to, or superior to, the item specified.

1.4 SUBSTITUTION REQUESTS

A. If the Contractor elects to prove such equality, he must request the Architect's and the Owner's approval in writing for substitution of such items for the specified items, stating the differences involved with and submitting supporting data and samples, if required, to permit a fair evaluation of the proposed substitution with respect to -

1. Performance;
2. Delivery times and effect on schedules, if any;
3. Safety;
4. Function;
5. Appearance;
6. Quality and durability;
7. Any required license fees or royalties;
8. Warranty terms and conditions;

The contractor shall submit a separate request for each product, supported with

complete data, with drawings and samples as are appropriate to substantiate the above.

B. The Architect, as set forth in the Post Bid Requirements in Section 002100, will review requests for substitutions with reasonable promptness, and notify the Contractor, in writing, of the decision to accept or reject the requested substitution.

1.5 OPTIONS

A. Where Technical Specifications permit Contractor to select optional materials, items, systems, or equipment, the selection of such options is subject to the following conditions:

1. Once an option has been selected and approved, it shall be used for the entire contract.
2. The Contractor shall coordinate his selection with the drawings and specifications and make all necessary adjustments without additional cost to the Owner.

1.6 CONTRACTOR'S REPRESENTATION

A. A request for a substitution constitutes a representation that the Contractor:

1. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified;
2. Will provide the same warranties or bonds for the substitution as for the product specified;
3. Will coordinate the installation of an accepted substitution in the work, and make such other changes in the work as may be required for installation to make the work complete in all respects;
4. Will waive all claims for additional costs, under its responsibility, which may subsequently become apparent.
5. **Will have coordinated installation with all affected trade contractors, specialty contractors and the like and will be responsible for any and all costs which may arise as a result of this substitution.**

1.7 REIMBURSEMENTS

A. As outlined in Section 013300, when resubmittals of materials, equipment and accessories to be incorporated in the project are necessary due to failure of Contractors to properly coordinate submittals, the submitting Contractor shall compensate the Design Professionals for required re-reviews of said submittals in accordance with the following fee schedule:

Principal's Time	$ 225.00 per
hour Associate's Time	$ 170.00
per hour Employees Time	Direct Personnel
Expenses X 3.0	

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

Engineer's Time	$ 175.00 per hour

The charges incurred will be deducted from the ensuing requisition at the direction of the Owner.

End of Section

6 November 2023
Issue for Bid

Nyack Union Free School District
District Wide Air Conditioning
- Cafeterias & Global Learning Commons

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

SECTION 012501 - 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 012900 - APPLICATIONS FOR PAYMENT

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment, and supplements provisions of Article 9, Payments and Completion, of the General Conditions of the Contract.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Schedule of Values

B. Applications for Payment

1.3 SCHEDULE OF VALUES – Article 9.2, General Conditions and Supplements thereto.

A. Coordination: Each prime Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with preparation of the Contractors' Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
   a. Contractor's Construction Schedule.
   b. Application for Payment forms, including Continuation Sheets.
   c. List of subcontractors.
   d. Schedule of alternates.
   e. Schedule of allowances
   f. List of products.
   g. List of principal suppliers and fabricators.
   h. Schedule of submittals.
2. Submit the Schedule of Values to the Architect in accord with Section 011100, Paragraph 1.8 B.2, at the earliest possible date but no later than seven (7) days before the date scheduled for submittal of the initial Applications for Payment.
3. Sub schedules: Where Work is separated into phases requiring separately phased payments, provide sub schedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section. For major trades with total line items exceeding $25,000, provide a separate, back-up breakdown of each such trade with line items for identifiable units of work within such trade each of which has a value not exceeding $25,000. Provide a computed unit price for each line total.

1. Identification: Include the following Project identification on the Schedule of Values:
   a. Project name and location.
   b. Name of the Architect

c. Project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value.
   h. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   i. Phase Area (as applicable).

   NOTE: Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

3. Provide a breakdown of the Contract Sum by Phase Area in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Application for Payment may include materials or equipment, purchased or fabricated and stored, but not installed. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.
6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Unit Price Work: Show the line-item value of unit-cost allowances, as a product of the unit multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
8. Temporary facilities, clean-up and other major cost items and correction of existing conditions are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.
9. Project Closeout Expenses including any and all expenses involving project

documentation, warranty assembly, inspection costs and fees and the like.

10. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Application for Payment when Change Orders result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT - See Article 9.3 of the General Conditions (Section 000700) and Supplements thereto.

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner. The initial Application for Payment, the Application for Payment at time of Substantial Completion and the final Application for Payment involve additional requirements.

B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement or in absence thereof the previous month.

C. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form of Applications for Payment.

D. Application Preparation: Complete every entry on the form. Include notarization and execution of person authorized to sign legal documents on behalf of the Contractor. The Architect will reject, and return, incomplete applications without action.

1. Entries shall match data on the approved Schedule of Values and the Contractor's Construction Schedule. Update schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
3. Provide copies of payrolls which are signed and notarized documenting compliance with prevailing wage laws as applicable to particular project.
4. Provide a Contractor’s Daily Work Log which include names, dates, locations, and work performed.

E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to the Architect by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments, when required. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

F. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub subcontractors and suppliers for the construction period covered by the previous application.

1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Applications for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner and/or as included as attachment to Section 007000.

G. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, shall include the following prerequisites to processing:
1. List of subcontractors, approved.
2. List of principal suppliers and fabricators, approved.
3. Schedule of Values, approved.
4. Contractor's Construction Schedule, approved.
5. Schedule of principal products.
6. Schedule of unit prices, approved.
7. Submittal Schedule, approved.
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits as applicable to project requirements.
11. Copies of authorizations and licenses from governing authorities for performance of the Work.
12. Initial progress report.
13. Report of pre-construction meeting.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire the Owner's insurance.
17. Initial settlement survey and damage report, if required by particular project.
18. Safety plan

H. Monthly Application for Payment Administrative actions and submittals, that must precede or coincide with submittal of the periodic Application for Payment, shall include the following:
1. As-built Record documents, required documents and submittal records on site.
2. Contractor's construction schedule, updated, with corrective action plan as applicable.
3. Material Status Report.
4. Stored Materials forms.
5. Submittal Schedule and submittal status reports.
6. RFI submittal and status log.
7. Monthly Progress report, and Notarized Progress Report Statement from each Contractor’s manager/superintendent stating that the work is on schedule, and that Contractor will meet the Substantial Completion date for the Work, and the Substantial Completion dates for every portion established under Construction Phasing Schedule Section.

I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previous to Owner occupancy of designated portions of the Work.

2. Administrative actions and submittals that shall precede or coincide with this application include:
   a. Occupancy permits and similar approvals.
   b. Warranties (guarantees) and maintenance agreements.
   c. Test/adjust/balance records.
   d. Maintenance instructions.
   e. Meter readings.
   f. Startup performance reports.
   g. Changeover information related to Owner's occupancy, use, operation, and maintenance
   h. Final cleaning.
   I. Application for reduction of retainage and consent of surety.
   j. Advice on shifting insurance coverages.
   k. Final progress photographs.
   l. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
   1. Completion of Project closeout requirements.
   2. Completion of items specified for completion after Substantial Completion.
   3. Ensure that unsettled claims will be settled.
   4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
   5. Transmittal of required Project construction records to the Owner.
   6. Certified property survey as and/if required by project documents.
   7. Proof that taxes, fees, and similar obligations were paid.
   8. Removal of temporary facilities and services.
   9. Removal of surplus materials, rubbish, and similar elements.
   10. Change of door locks to Owner's access.
   11. Consent of Surety to final payment.

End of Section

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

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

SECTION 013113 - PROJECT COORDINATION

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Coordination of Work

B. Trade Contractor Obligations

1.3 COORDINATION OF WORK

A. As required by the General Conditions (Section 00 70 00), and restated herein, each Trade and/or Specialty Contractor or Subcontractor shall compare the architectural, structural, civil/site, mechanical and electrical Drawings and Specifications with those for all other trades and shall report any discrepancies between them to the Architect, through the Construction Manager, and obtain from the Architect written instructions for changes necessary to the work. All work shall be installed in cooperation with other trades installing interrelated work. Before installation, each Trade Contractor shall make proper provisions to avoid interference in a manner approved by the Architect. All changes required in the work caused by neglect to so advise the Architect shall be made by the offending Contractor at his own expense.

B. Each Trade Contractor shall be responsible for exact location of anchor bolts, sleeves, inserts, supports, chases, conduits and openings that may be required for the work.

Attention is directed to Section 013114. Each Trade Contractor shall prepare layout drawings for incorporation of items to be built-in the work, pass through the work and the like in sufficient time so as not to cause any undue delay in the execution of the work.

Built-in items shall be furnished under the same Section of the Specifications as the respective items to be supported, and they shall be installed, except as otherwise specified, by the trade furnishing and installing the material in which they are to be located. The trade responsible for the installation of anchor bolts shall also insure that they are properly installed. Chases, conduits and openings shall be laid out in advance to permit provision in work. Sleeves and inserts shall not be used in any portion of the building, where their use would impair strength or construction features of the building. Sleeves, conduits and inserts shall be set in forms before concrete is poured. Extra work required where anchor bolts,

supports, sleeves, chase openings, conduits or inserts have been omitted or improperly placed shall be performed at expense of trade which made the error or omission.

C. Slots, chases, openings and recesses through floors, walls, ceilings and roofs as specified will be provided for the various trades in their respective materials under general construction work, but the trade requiring them shall see that they are properly located and shall do any cutting and patching caused by the neglect to do so.

D. Locations of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc. shall be adjusted to accommodate the work to interferences anticipated and encountered. Each Trade Contractor shall determine, and submit for approval, the exact route and location of each pipe, duct and electrical raceway prior to fabrication.

Approval by the Architect is required prior to any such modifications.

E. Lines which pitch shall have the right of way over those which do not pitch.

For example, plumbing and condensate piping drains shall normally have right of way.

Lines whose elevations cannot be changed shall have the right of way over lines whose elevations can be changed.

F. Offsets, transitions and changes in direction in pipes, ducts and electrical raceways shall be made as required to maintain proper headroom and pitch of sloping lines whether or not indicated on the Drawings. Each Trade Contractor shall provide air vents, sanitary vents, pull boxes, etc.; as required to effect these offsets, transitions and changes in direction.

G. Each Trade Contractor shall install all mechanical and electrical work to permit removal (without damage to other parts) of coils, heat exchanger bundles, fan shafts and wheel, draw-out circuit breakers, filters, belt guards, sheaves and drives and all other parts requiring periodic replacement or maintenance. Each Trade Contractor shall arrange pipes, ducts, raceways, traps, starters, motors, control components, and the like, to clear the openings of swinging and overhead doors and of access panels.

H. In all locations where subjected to public access, or in any occupied spaces, any and all piping systems servicing mechanical delivery systems which run on the face of construction shall be encased in a permanent encasement such as steel studs and drywall; steel framing, lathing and plaster; or other suitable and approved materials.

I. AS REQUIRED BY COORDINATED SCHEDULING, The General Contractor shall provide temporary weathertight and protected openings in structure to facilitate placement of equipment.

1.4 TRADE CONTRACTOR OBLIGATIONS

A. The Trade Contractors are required to supply all necessary supervision and coordination information to any other trades who are supplying work to accommodate the electrical and mechanical installations.

B. Where a trade is required to install items which it does not purchase, it shall include for such items:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven in to any designated point on the property line at grade level.
3. Their safe handling and field storage up to the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected.
5. Their field assembly and internal connection as may be necessary for their proper operation.
6. Their mounting in place including the purchases and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions unless support members are shown on structural or architectural drawings.
7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

C. Items which are to be installed but not purchased as part of the work of a particular trade shall be carefully examined by this trade upon delivery to the project.

Claims that any of these have been received in such condition that their installation will require procedures beyond the reasonable scope of the work of the installing trade will be considered only if presented in writing within one week of the date of delivery to the project of the items in question.

The work of the installing trade shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

End of Section

SECTION 013114 - COORDINATION DRAWINGS AND PROCEDURES

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 007 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 013200, and Article 1 of the General Conditions of the Contract (Section 007 00).

D. Coordination of the work shall be performed as outlined below.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Scheduling (Coordinate with Section 013200)

B. Coordination Drawings and Procedures - Electrical Work

C. Meetings (Coordinate with Section 013119)

D. Penalties

1.3 SCHEDULING

A. Development of coordination drawings shall begin immediately upon award and shall not be dependent upon structural shop drawings; development shall be based upon structural information included on the Contract Documents.

B. During the “final” review of the coordination drawings, the approved structural shop/fabrication drawings shall be checked and any conflicts identified. General Contractor shall coordinate and insure structural shop drawings are processed so as to meet this requirement. Failure to prosecute same in a timely manner will be cause for implementation of penalties as outlined in 1.07 herein.

C. Progress of coordination drawings must be reported at every project meeting until accepted.

1.4 COORDINATION DRAWINGS AND PROCEDURES - GENERAL CONSTRUCTION WORK

Attention is directed to this Section 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”.

1.5 COORDINATION DRAWINGS AND PROCEDURES - MECHANICAL/ELECTRICAL WORK

A. Electrical work shall be coordinated as indicated by the following procedure. Review of coordination drawings shall not diminish responsibility under this Contract for final coordination of installation with Architectural work.

NOTE: Electronic documents (CAD files) can be used for these operations based upon agreement between all parties and in accordance with terms and conditions set for obtaining of CAD files as per attachment to Section 013300.

B. Coordination Drawings include but are not necessarily limited to:
   1. Partition/room layout.
   2. Ceiling tile and grid.
   3. Light fixtures.
   4. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
   5. Above ceiling miscellaneous metal.
   6. Fire Protection Systems.

C. All coordination drawings shall be delivered to the Architect at the end of the project as part of the record drawing requirements set forth in Article 3.11 of the General Conditions.

1.6 MEETINGS – Coordinate with Section 013119

A. Coordination meetings to resolve interferences in the work will be held at the project site under the direction of the Architect and Construction Manager.

Representatives of each Contractor shall be present at each meeting.
Each Contractor shall provide the necessary manpower and/or overtime to insure that the coordination process described herein does not delay the Project Schedule.

1.7 PENALTIES

A. FAILURE OF ANY INDIVIDUAL PRIME CONTRACTOR TO PARTICIPATE IN THE PREPARATION OF SAID COORDINATION DRAWINGS AND TO OBTAIN ARCHITECT'S REVIEW AND CONCURRENCE THEREOF WILL RESULT IN FORFEITURE OF THEIR RIGHT OF PAYMENT UNTIL SAID DRAWINGS ARE ACCEPTED.

B. REPEATED VIOLATIONS OF THIS CONTRACTUAL REQUIREMENT CONSTITUTES A BREACH OF THE AGREEMENT BETWEEN THE OWNER AND THE OFFENDING PRIME CONTRACTOR THAT MAY BE GROUNDS FOR TERMINATION OF SUCH CONTRACT.

HOWEVER, THE FAILURE OF THE OWNER TO SO TERMINATE SHALL NOT RELIEVE THE CONTRACTOR FROM FUTURE COMPLIANCE WITH THE TERMS AND CONDITIONS OF THIS SECTION.

End of Section

SECTION 013119 - PROJECT MEETINGS

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Initial (Kick-Off or Orientation) Meeting
B. Regular Project Meetings
C. Job Progress Meetings
D. Job Coordination Meetings
E. Pre-Installation Conferences
F. Recording

NOTE: As part of all individual meetings outlined above there shall be a Waste Management program discussion held with all responsible parties in attendance.

1.3 INITIAL (KICK-OFF OR ORIENTATION) MEETING

A. The Construction Manager will schedule the initial job meeting, prior to the start of any work, at the project site and will notify all parties concerned of the time and place of the meeting.

B. Attendance:
   1. Prime Contractor (s).
   2. Construction Manager.
   3. Owner’s Representative or Owner.
   4. Architect and principal consultants.
   5. Major subcontractors and suppliers as deemed appropriate.
   6. Representative of Testing Laboratory if independent.

C. Review and Discuss:
   1. Relation and coordination of various parties, and responsible personnel for each party.
   2. Use of premises, including office and storage areas, temporary controls, and security procedures.
   3. Waste management requirements as outlined in Section 017419.
   4. Construction schedule and critical work sequencing.
   5. Processing of:
      a. Contract modifications.
      b. Shop Drawings, Product Data, and Samples.
      c. Applications for Payment.
      d. Substitutions.

e. Requests for Information.
f. Other required submittals.

6. Adequacy of distribution of Contract Documents.
7. Procedures for maintaining contract closeout submittals.
8. Installation and removal of temporary facilities.

D. Notification procedures and extent of testing and inspection services

E. The meeting will be conducted by the Architect and Construction Manager and shall address the conduct of the job, lines of communications, and the like. Discussions on waste management requirements as outlined in Section 017419 shall be part of the agenda.

F. All Contractors are required to attend.

1.4 JOB PROGRESS MEETING AGENDA

A. Coordinate the Work of the Project (Reference Section 013114).

B. Establish a sound working relationship among the Contractors, the Architect and the Owner.

C. Review and update progress, submittal and delivery schedules.

D. Review job progress.

E. Review progress payment requests; change proposals and change orders.

F. Expedite the work to completion within the project schedule.

G. Provide a 2 week look ahead schedule.

1.5 JOB PROGRESS MEETINGS

A. Unless otherwise directed, bi-weekly job meetings will be held by the Construction Manager. Present at these meetings shall be EACH CONTRACTOR or a representative authorized to make commitments for action on behalf of the Contractor and the Owner.

B. EACH CONTRACTOR shall arrange for the participation of its Subcontractors when their presence is required by the Construction Manager and/or the Architect.

C. In addition to Article 1.04, the minimum agenda will cover:

1. Review minutes of previous meetings.
2. Note field observations, problems, and decisions.
3. Identify present problems and resolve them.
4. Plan work progress during next work period and its effect on the related work of others.
5. Review shop drawings and submittal schedules.
6. Review change order status.
7. Review status of construction progress schedule.
8. Coordinate occupancy arrangements and access requirements with Owner.
9. Discussions on waste management requirements as outlined in Section 017419 shall be part of the agenda.

1.6 JOB COORDINATION MEETINGS (Reference Section 013114)

A. On a bi-weekly basis, either on the day of the scheduled job progress meeting, or

such other time established, a "working" coordination meeting will be held at the project site. Present at these meetings shall be **each contractor's site supervisor** with men working, or **scheduled to work within the ensuing 2 weeks**, and the Owner's Construction Manager.

Further, prior to the start of any major trade work, a coordination meeting following the guidelines established herein shall be held subject to the same parties' presence as for general meetings.

B. Each meeting shall be used to coordinate work between contracts for the ensuing 2 weeks. At the close of the meeting, each supervisor shall, in an agreed format, provide a summarized 2 week work plan to the other Contractors and the Construction Manager.

C. The time and place for the meetings will be as established in the preconstruction meeting.

D. Minutes will be taken by the party designated and distributed to all parties involved and the Construction Manager or the General Contractor will provide, at the next regular progress meeting, a verbal report of the date and time of the last coordination meeting and a listing of those present.

1.7 PRE-INSTALLATION CONFERENCES

A. Where required in individual specification Section, convene a pre-installation conference at project site or other designated location.

B. Require attendance of parties directly affecting or affected by work of the specific Section.

C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.8 RECORDING: The Construction Manager or the Architect, as agreed to by contract, shall write minutes of all meetings and distribute them to all parties present and to those on the distribution list given out at the orientation meeting within 48 hours of the meeting.

End of Section

SECTION 013200 - SCHEDULING AND PROGRESS

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. Contractor, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractor" involved with the work of this Project.

1. "Contractor for General Construction (CGC)" meaning the party responsible for the preparation of, and monitoring of, the coordinated project progress schedule (CPPS) prepared in consort with the "Prime Contractors" as defined below;
2. "The Contractor" or "Contractor" meaning that Prime Contractor normally responsible for that work referenced;
3. "Prime/Trade Contractor" meaning either the - General, Plumbing, HVAC or Electrical Contractors normally responsible for the referenced work;
4. "Coordinated Project Progress Schedule (CPPS)" meaning that schedule prepared by the "Contractor for General Construction" with all required input from each of the "Prime Contractors" as defined in Paragraph 1.01.C.3 above.

and such other terms relating to Contractors to be taken in context with respect to referenced work.

D. The requirements set forth within this section are directed to all Contractors involved in the work and shall be considered mandated requirements subject to penalties as defined elsewhere in this Section.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Preliminary Requirements
B. Commencement, Prosecution and Completion of the work
C. Coordinated Submittal Schedules
D. Proposed Product List and Status Report on Material Orders - See Article 1.11 of Section 013300; failure to comply with these requirements shall result in rejection of schedules and withholding of any requisitions.
E. Coordinated Project Progress Schedule
F. Breach of Contract
G. Time of Completion

1.3 PRELIMINARY REQUIREMENTS (Coordinate with Post-Bid Requirements set forth in Section 002100)

A. Within three (3) working days after notification from Architect, and before the Contract is executed, the three (3) apparent low bidders must submit to the Architect, in writing, a list of duration’s and a sequence, in the form of a bar chart, for all activities that are the responsibility of the bidder. Contractor's proposed work force and other resource loading for each activity of the bar chart, broken

down by trades, must also be provided. Failure to comply with this requirement may be cause for rejection of the bid.

B. The apparent low bidders, concurrent with the submission of bar chart for each school, shall also submit to the Architect, in writing, the following information:
   1. Shop drawing and material sample schedules keyed to the duration's submitted in the bar chart. (See Section 013300)
   2. Schedules for the award of subcontractor and equipment contracts keyed to the duration's submitted for the bar chart.
   3. The name of the person who, as Scheduling Coordinator for the apparent low bidder, is authorized to act on behalf of the apparent low bidder on all matters of scheduling included in this Section. Once named, the Scheduling Coordinator may only be replaced after written notice is given to the Construction Manager and Architect. The Contractor agrees, upon the request of either of the two parties, to replace the Scheduling Coordinator.

C. Failure to comply with this subsection 1.03 of this Section of the General Requirements may be cause for rejection of the bid and forfeiture of security. (See the "Post-Bid Procedures" in the Instructions to Bidders 00 21 00.)

1.4 COMMENCEMENT, PROSECUTION AND COMPLETION OF THE WORK

A. Contractor shall commence work under this contract upon receipt by him of Letter of Intent to Award, Notice to Proceed, and/or Execution of the Contract, and shall prosecute said work diligently and complete the work within the stated calendar days for each portion of the work as set forth in Section 011000.

B. The time stated for completion for contract work includes final cleanup of area. Upon completion of total Contract work, ALL AREAS SHALL BE CLEAN.

C. The Contractor is to carry on responsibility for services and maintenance of such items as temporary roads, walks, ramps, field offices, parking areas, environmental controls and the like until work under this contract is complete, unless otherwise directed by the Owner. Coordinate work herein with Section 01 10 00, Description of Work.

1.5 COORDINATED SUBMITTAL SCHEDULES

A. Within two (2) weeks after receipt of Letter of Intent to Award, Notice to Proceed, and/or Execution of the Contract, <u>each Contractor shall submit, to each other for review and comment prior to submittal to the Contractor for General Construction</u>, a detailed listing of all items to be incorporated within the work, including all items of mechanical and electrical.

This agreed upon information will then be incorporated in the "CPPS" as prepared by the "CGC" in accordance with this Section.

Listing should generally include the following:
1. Overall project milestones;
2. Proposed products list and status report on material orders.

3. Dates of shop drawing/sample submittals;
4. Guaranteed delivery dates after shop drawing and/or sample approvals;
5. Date of installation start;
6. Date of installation completion.

1.6 COORDINATED PROJECT PROGRESS SCHEDULE

A. Within two (2) weeks after receipt of Letter of Intent to Award, Notice to Proceed, and/or Execution of the Contract, but prior to the actual start of the field work, the Contractor for General Construction shall submit to the Architect for his approval the proposed Coordinated Project Progress Schedule giving the information listed below.

In order to complete the "CPPS" each Contractor shall submit to each other for review, comment and time coordination prior to submittal to the Contractor for General Construction, their requirements so as to allow for said schedule to be drawn.

EACH CONTRACTOR SHALL SIGNIFY ACCEPTANCE OF SAID COORDINATED PROJECT PROGRESS SCHEDULE BY SIGNING PRIOR TO SUBMITTAL.

FAILURE OF THE "CGC" TO SUBMIT SAID COORDINATED PROJECT PROGRESS SCHEDULE AND TO OBTAIN APPROVAL THEREOF WILL RESULT IN FORFEITURE OF RIGHT OF PAYMENT UNTIL SAID SCHEDULE IS APPROVED.

SHOULD SUCH FAILURE BE CAUSED BY THE LACK OF COOPERATION ON THE PART OF ANY CONTRACTOR, SAID CONTRACTOR WILL BE PENALIZED BY FORFEITURE OF RIGHT OF PAYMENT AS WELL AS BEING HELD RESPONSIBLE FOR ANY DELAYS AND RESULTANT COSTS AS OUTLINED IN THE GENERAL CONDITIONS THAT MAY ACCRUE UNTIL SUCH PARTICIPATION IS FORTHCOMING AND SAID SCHEDULE IS APPROVED.

The minimum information contained within the required project progress schedule shall consist of -

1. The estimated dates the various classes of work included in the Schedule of Values will be started and completed.
2. The estimated percentages of completion to be obtained and the total dollar value of the various classes of said work projected to the end of each calendar month until substantial completion.

   Calculations shall be based upon - work in place; materials on site and not installed; materials fabricated and stored under suitable conditions and insured to full value in a manner satisfactory to Architect and Owner; and such other items as may be agreed to among the Contractor, Architect, Construction Manager and Owner.

3. The estimated delivery and installation dates of the major pieces of equipment to be furnished and installed by the Contractor.
4. The estimated projected progress of work that will be performed away from the job site.
5. A delineation of the work that will be performed by the Contractor's own forces and by his Subcontractors.
6. The estimated calendar dates on which all the work under the contract will be completed and ready for substantial completion and final inspections.

B. The Coordinated Project Progress Schedule shall be based on an orderly progression of the Work, allowing adequate time for each operation, and leading to a reasonable certainty of Substantial Completion by the date established in Section 011000.

The "CPPS" will be reviewed by the Architect and Construction Manager for compliance with the requirements of this article and will be accepted by them or returned to the "CGC" for revision and resubmittal.

In the event that said schedule is returned, each contractor shall participate in the revision, as required, to prepare same for resubmittal.

Unless specifically required by law, no payment under this Contract shall be due until the Progress Schedule has been submitted to the Architect and Construction Manager and approved by both parties.

C. As the work progresses, an up-to-date copy of the "CPPS" with the actual percent completion of the various classes of the work indicated in red shall be submitted by the "CGC", with input from each Prime Contractor, to the Architect and/or Construction Manager during the first week of each calendar month. (Distribution to be established as part of “preconstruction meeting”.

Each Prime Contractor shall sign the monthly schedules as a prerequisite to the requisitioning process.

The "CPPS" may be adjusted and revised to meet unforeseen job conditions, but such changes shall, at all times, be approved by the Architect and the Construction Manager.

D. A copy of the "CPPS" shall be available at all times at the job site for the inspection and guidance of other Contractors, Subcontractors and Vendors engaged on any construction phase of the project.

It shall be the responsibility of Each Contractor to ascertain that all his Subcontractors, Vendors and Material men periodically consult the Schedule so that their work schedule shall be maintained in conformance with his own.

It shall also be the responsibility of Each Contractor to periodically consult the Job Progress Schedules of any other Contractors that may be engaged on any

separate construction of the project, so that undue delay in progress on their part shall not delay the work of the other Contractors.

E. AN UP-TO-DATE COPY OF COORDINATED PROJECT PROGRESS SCHEDULE MUST BE ATTACHED TO MONTHLY REQUISITION IN ORDER FOR PROCESSING TO BEGIN.

INCOMPLETE REQUISITIONS WILL BE REJECTED.

1.7 BREACH OF CONTRACT

A. The Contractor's failure to comply with any requirement called for in subsections 1.04, 1.05 and 1.06 above shall constitute a material breach of the Contract, and the Owner shall have the right to and may terminate the Contract, provided, however, that the failure of the Owner to so terminate shall not relieve the Contractor from future compliance.

1.8 TIME OF COMPLETION – Coordinate with Article 8 of the General Conditions of the Contract for Construction (Section 00 70 00), and Description of Work (Section 011000). A. Notwithstanding the implementation of the Construction Schedule, it is the sole responsibility of the Contractor to complete the Work within a Contract Time which will assure the substantial completion of the Project by the required date.

End of Section

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include, but are not limited to, the following:

1. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
2. Division 01 Section "Closeout Procedures “for submitting warranties ,Project Record Documents and operation and maintenance manuals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Background Drawings of the Contract Drawings will available from the Architect for use in preparing submittals. 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.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
3. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
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.

C. Submittals Schedule:

1. Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

1. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
2. The average review time required by the Architect for a submittal will be fifteen (15) business days for processing solely by the Architect's office and twenty (20) business days for processing when review by Architect's consultant is required.

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

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

F. Paper and Physical Sample Submittals: Place Architect's Submittal Cover Sheet, which is included at the end of this section, on each submittal for identification. 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.

1. Include Contractor's stamp indicating information complies with Contract Document requirements.
2. Submittals indicating less than complete review by Contractor will be returned for Contractor's compliance without Architect's review.
3. Transmit all submittals to Architect with a copy to the Construction Manager unless otherwise indicated. Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
   a. 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.

G. 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. Name file with submittal number or other unique identifier, including revision identifier.
3. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner.

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

I. 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.

J. 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.

K. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

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.

L. 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

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

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

Sections.

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.

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

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. 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 written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Standard color charts.
   e. Manufacturer's catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Standard product operating and maintenance manuals.
   j. Compliance with recognized trade association standards.
   k. Compliance with recognized testing agency standards.
   l. Application of testing agency labels and seals.
   m. Notation of coordination requirements.

5. Submittals: Submit pdf electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. 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: Include the following information, as applicable:
   a. Dimensions.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.

f. Shopwork manufacturing instructions.
g. Schedules.
h. Compliance with specified standards.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Number of Copies: Submit pdf electronic file, unless paper copies are specifically required by Architect.

D. Samples: Prepare physical units of materials or products, including the following:

1. 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.
2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the 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.
3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
   a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
   b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

4. Number of Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, will return submittal with options selected.
5. Number of Samples for Verification: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
   a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

6. Schedule: Include significant sample submittals in the Contractor's Construction Schedule.
7. 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 not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

E. Mockups: Mock-ups and field samples specified in individual Sections are full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

1. Comply with submittal requirements to fullest extent possible. Process transmittal forms to provide record of activity.

F. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation."

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit pdf electronic file.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific

Project.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

I. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. 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.

M. Research/Evaluation Reports: Prepare 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.

N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and

normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."

O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

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

S. Material Safety Data Sheets: Submit information directly to Construction Manager. If submitted to Architect, Architect will not review this information but will return it with no action taken.

1. Submit MSDS’s for all products used during construction whether incorporated in the Work or used in the performance of the Work.
2. Construction Manager will compile a central file of MSDS’s on the site, which will be

available to workers and others in accordance with “Right to Know” legislation.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field verify all dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal and submittal cover sheet with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Except for submittals for information or similar purposes, where action and return is required or requested, Architect will review each submittal, mark to indicate action taken, and return.

1. Compliance with specified characteristics is Contractor's responsibility.

C. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Contractor may proceed with fabrication on "REVIEWED" or "FURNISH AS NOTED" shop drawings 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 "REVIEWED" or "FURNISH AS NOTED" stamp is received on resubmitted drawing.
   a. Do not permit submittals marked "Revise and Resubmit," or "Rejected," to be used at Project site, or elsewhere where Work is in progress.

3. Other Action: Where submittal is primarily for information or record purposes, special processing or other activity, submittal will be returned, marked "Action Not Required."

D. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

E. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

ATTACHMENTS: SUBMITTAL
COVER SHEET

CONTRACTOR REQUEST FOR ELECTRONIC DRAWING FILES

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

SECTION 013301 - 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 herein below 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 in DWG/DWF format (Drawings may be compressed). 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 as may be required.

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

6 November 2023
Issue for Bid

Nyack Union Free School District
District Wide Air Conditioning
- Cafeterias & Global Learning Commons

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

SECTION 013302 - SUBMITTAL COVER SHEET

Contractor:_____

Address:_____Telephone**:** (___)_____

Owner: Nyack Union Free School District

Name of Project: Nyack District Wide Air Conditioning

TYPE OF SUBMITTAL:

☐Shop Drawings ☐Schedule ☐Physical Sample
☐Technical Data ☐Certificate ☐Color Sample
☐Test Report ☐Warranty ☐_____

Submission #: **1st , 2nd, 3rd, 4th** (circle one)

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

KAEYER, GARMENT + DAVIDSON ARCHITECTS, P.C.

DATE_____ BY_____

SECTION 013529 - HEALTH AND SAFETY PLAN

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Provide all labor, equipment and materials and perform all operations in connection with monitoring air quality, decontaminating equipment and providing worker health and safety protection for all Contractor and Subcontractor personnel.

B. Develop a site specific Health and Safety Plan (HASP) specifically addressing the potential hazards that may be encountered. This plan shall meet all Occupational Safety and Health Administration (OSHA) requirements.

C. Review the requirements and data presented and supplement the program with any additional measures deemed necessary to fully comply with regulatory requirements and adequately protect personnel on the site.

1.3 REFERENCES

A. OSHA Regulation 29 CFR 1910.120

B. OSHA Regulation 29 CFR 1926.62

1.4 DEFINITIONS

A. Site Safety Official (SSO): The individual who is responsible to the Contractor and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

B. SSO shall possess full and complete authority to order stoppage of any work which he deems unsafe.

1.5 SUBMITTALS

A. Provide within seven (7) days after execution of the Agreement.

1. Site-specific HASP including the Emergency Response Plan to the Owner, Construction Manager and Architect for review, including provisions for decontamination and a contingency plan for unforeseen emergencies. The review is only to determine if the HASP meets basic regulatory requirements and the minimum requirements of this Section. The review will not determine the adequacy of the HASP to address all potential hazards, as that remains the sole responsibility of the Contractor.
2. Current certification of employee's health and safety training and

certification of employee's baseline medical exam status.

3. Certification of additional required health and safety training for Supervisors.
4. Qualifications and experience of the SSO for approval.

B. Submit minutes of weekly safety meetings at periodic progress meetings.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Contractor is solely responsible for the health and safety of workers employed by the Contractor, any Subcontractor and anyone directly or indirectly employed by any of them.
B. Develop and follow a site specific Health & Safety Plan (HASP) in accordance with the requirements of paragraph 1.07.
C. Provide a full-time SSO regardless of whether or not the Work is at a defined Uncontrolled Hazardous Waste Site.
D. Pre-arrange emergency medical care services at a nearby hospital, including establishment of emergency routes of travel.
E. Meetings:
   1. Conduct daily job briefings with all site personnel to discuss relevant health and safety issues including but not limited to hazards, monitoring, procedures and controls. Document attendance and topics covered.
   2. At a minimum, conduct weekly safety meetings with all site personnel, documenting attendance and topics covered.
F. Train all workers assigned to areas where contaminated media are likely to be encountered in accordance with 29 CFR 1910.120.
G. Include those workers involved with the abatement of Asbestos containing materials in a medical surveillance program and respiratory protection program that meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134, respectively.
H. In areas where contaminated media are likely to be encountered, monitor air quality in and around work area using appropriate air monitoring equipment/analysis, as indicated in Part 2. Record all readings and maintain record on site. Stop work and/or upgrade respiratory protection or personal protective equipment levels if action levels established in the HASP are exceeded. Ensure that degree and type of respiratory protection provided is consistent with the monitored concentrations and individual chemical parameters. Lawfully dispose of all contaminated clothing and equipment that cannot be decontaminated.

1.7 HEALTH & SAFETY PLAN (HASP) REQUIREMENTS

A. The following items shall be addressed in the HASP:
   1. safety and health hazard assessment;
   2. procedures for emergency medical treatment and first aid;
   3. map indicating route to hospital for emergency medical care;
   4. Lead Exposure Control Plan (29 CFR 1926.62);
   5. equipment decontamination procedures;
   6. air monitoring procedures and action levels;
   7. personal protective equipment and decontamination;

8. physical hazard evaluation and abatement including:
   a. equipment operation;
   b. confined space entry;
   c. slips and falls;
   d. building collapse;
   e. falling debris;
   f. encountering unmarked utilities;
   g. cold and heat stress;
   h. hot work (cutting and welding);
   i. excavation entry;
9. training requirements;
10. recordkeeping requirements;
11. emergency response plan that includes:
   a. names of three (3) Emergency Response Contractors, experienced in the removal and disposal of oils and hazardous chemicals, that the Contractor intends to use in the event of an emergency;
   b. evacuation routes and procedures;
   c. emergency alerting and response procedures.

1.8 CONTINGENCY MEASURES & NOTIFICATIONS

A. The potential for encountering hazardous buried objects or materials that could pose a threat to human health or the environment exists at the Project Site. In the event that potentially hazardous materials are encountered during the work under this contract, the responsibilities of the Contractor and the Construction Manager are described herein.

B. The procedures and protocols to be used by the SSO in defining materials that are potentially hazardous include screening with a photoionization detector, odor, visual appearance of a material, and obvious oil or chemical contaminated materials.

C. Upon encountering suspected hazardous buried objects or materials as described above, cover the excavation immediately if no imminent danger, as defined by the SSO, is present. If there is an imminent danger, as defined by the SSO, evacuate the area immediately. The SSO shall then notify the Construction Manager of the situation.

D. Establish, properly barricade, and mark the area as an exclusion zone under the direction of the SSO. The SSO shall establish the exclusion zone boundaries based upon air quality monitoring using a photoionization detector and other equipment as appropriate. The exclusion zone shall be established at a minimum 50-foot radius around the location where the potentially hazardous material is encountered. Work within the exclusion zone shall be discontinued until the hazardous condition has been remediated and testing indicates that a hazard does not exist. Other activities of the site, outside the limits of the exclusion zone shall continue. Ambient air quality monitoring shall be performed by the SSO to demonstrate that ambient air quality in other portions of the site is not adversely impacted by the exclusion zone condition.

E. Notify Owner's Representative regarding the presence of potentially hazardous materials. Construction Manager or the Owner may direct the Contractor to notify

regulators and to obtain necessary regulatory approvals for remediation.

F. Mobilize the appropriate equipment and personnel to sample and test the hazardous material within the exclusion zone to determine the remedial action required, subject to the Construction Manager's or the Owner's direction. Contractor may be directed to remove and legally dispose of the material. Compensation for the removal and disposal of hazardous material will be as a Change in Work and Change in Contract Price in accordance with the Subcontract Agreement, if not covered under a specific bid item.

PART 2 - PRODUCTS

2.1 AIR MONITORING EQUIPMENT

A. Provide and maintain portable photoionization detector or organic vapor analyzer capable of detecting organic vapors or total hydrocarbons. Equipment shall be sensitive to the 0.5 PPM level.

B. Provide and maintain an oxygen analyzer to measure oxygen concentration in any trench or confined space prior to entry, as determined by the SSO.

C. Provide and maintain an explosimeter whenever the potential for accumulation of explosive gases exists, as determined by the SSO.

D. Provide and maintain air monitoring equipment as required for the collection/monitoring of airborne asbestos fibers. All air samples related to abatement work shall be analyzed by a laboratory accredited by the American Industrial Hygiene Association.

E. All air monitoring equipment shall remain the property of the Contractor.

PART 3 – EXECUTION

NOT USED

End of Section

SECTION 014100 - PERMITS AND COMPLIANCE

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Preconstruction Meeting
B. Permits and Licenses
C. Compliance
D. Additional Compliance

1.3 PRECONSTRUCTION MEETING

A. After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner and Architect to discuss the applicable environmental regulations and requirements; coordinate with Sections 015713, 015719 and 017419.

B. 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 environmental regulations bearing on performance of the Work.

1.4 PERMITS AND LICENSES

A. The Contractor shall obtain, maintain and pay for all permits and licenses necessary for the execution of the work and for the use of such work when completed.

1.5 COMPLIANCE

A. The Contractor shall give all notices, pay all fees and comply with all laws, rules and regulations applicable to the work.

1.6 ADDITIONAL COMPLIANCE

A. The Contractor, Subcontractors, and the employees of the Contractor and Subcontractors, shall comply with all regulations governing conduct, access to the premises, operation of equipment and systems, and conduct while in or near the premises and shall perform the work in such a manner as not to unreasonably interrupt or interfere with the conduct of business of the Facility.

B. **Further, attention is directed to requirements of Section 011501.**

End of Section

SECTION 01421 - CODES AND STANDARDS

1.1 QUALITY ASSURANCE

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. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.2 REFERENCE STANDARDS - The abbreviations, which may be used in the construction specifications, refer to the organizations and specifications of the organizations listed below.

AABC	Associated Air Balance Council
AAN	American Association of Nurserymen
AI	Asphalt Institute
AISC	American Institute of Steel Construction AMCA
	Air Movement and Control Association ARMA
	Asphalt Roofing Manufacturers Association ASC
	Adhesive and Sealant Council
ASLA	American Society of Landscape Architects
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASTM	American Society for Testing and Materials International
CLFMI	Chain Link Fence Manufacturers Institute
CRI	Carpet and Rug Institute
GANA	Glass Association of North America
GS	Green Seal
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IGMA	Insulating Glass Manufacturers Alliance
LSGA	Laminators Safety Glass Association
NAIMA	North American Insulation Manufacturers Association
NFPA	National Fire Protection Association NFRC
	National Fenestration Rating Council NHLA
	National Hardwood Lumber Association
NPCA	National Paint and Coatings Association NPA
	National Particleboard Association
NSF	National Sanitation Foundation International
NTMA	The National Terrazzo and Mosaic Association

RFCI	Resilient Floor Covering Institute
SIGMA	Southern Forest Products Association
SPC	Sealed Insulating Glass Manufacturers Association
SSPC	Southern Pine Inspection Bureau (Grading Rules)
WDMA	Steel Structures Painting Council
WRI	Window & Door Manufacturers Association
WWPA	Wire Reinforcement Institute, Inc.
	Woven Wire Products Association

B. Federal Agencies:

CE	Army Corps of Engineers
CPC	Consumer Product Safety Commission
EPA	Environmental Protection Agency
DOE	Department of Energy
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration

Further attention is directed to industry guide compiled by Sweet's division of McGraw-Hill denoted as "PROJECT INFORMATION AND SERVICES" as well as in the web site www.4specs.com wherein a comprehensive list of international organizations representing building product manufacturers, associations, institutes, governmental agencies and testing bureaus is put forth.

End of Section

SECTION 014326 - TESTING LABORATORY SERVICES

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

D. Pursuant to the provisions of Section 013300, Submittal Requirements, it is further required that unless otherwise specified, tests called for in the Specifications applicable to the work and/or required to implement the work shall be paid for by the Owner.

E. Where tests are required by the Architect to substantiate conformance to the specifications the Owner will pay all costs of such tests and engineering services unless said tests indicate that the workmanship or materials used by the Contractor are not in conformance with the Drawings, Specifications, Approved Shop Drawings or the approved materials.

In such event, the Contractor shall pay for the tests, remove all work and material so failing to conform, REPLACE with work and materials which are in full conformity.

F. Requirements related to testing services and specified elsewhere in these documents include:

1. Inspections and testing as required by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction over the work.
2. Certification of compliance as required by individual specification sections.
3. Testing, adjusting and balancing of mechanical equipment and systems.
4. Project record documents, including operation and maintenance manuals, record drawings and the like.
5. Tests and standards governing work and/or materials as may be specified throughout these specifications and/or as shown on the drawings.

G. The Owner will employ, and pay for, the services of an Independent Testing Laboratory to perform all specified services.

H. Inspection, sampling and testing is required for the following as applicable to the particular project:

- Concrete, formwork, reinforcing and the like.
- Masonry and mortar.
- Roofing and flashing systems
- Structural steel systems, joists, decking, light metal framing and the like.
- Welding

however this listing is to be considered as partial only with the burden placed on the Contractor to advise, and the Laboratory to provide, all such inspections, sampling and testing as may be specified and/or required by these Contract Documents and the applicable laws and ordinances of the jurisdiction.

I. Employment of the Testing Laboratory shall not relieve the Contractor of his obligation to perform Work in accordance with the Contract.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Laboratory Qualifications
B. Laboratory Duties
C. Contractor's Responsibilities
D. Tests Required

1.3 LABORATORY QUALIFICATIONS

A. Laboratory shall meet -
   1. The "Recommended Requirements for Independent Laboratory Qualifications", latest edition as published by the American Council of Independent Laboratories.
   2. Basic requirements of ASTM E 329, latest edition, governing "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".

B. Laboratory shall submit copy of inspection of facilities as made by Materials Reference Laboratory of the National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

C. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to either - National Bureau of Standards or accepted values of natural physical constants; submit copy of certificate of calibration as executed by an accredited calibration agency.

1.4 LABORATORY DUTIES

A. Cooperate with Architect and Contractor; provide qualified personnel promptly on notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction in conformance with specified standards, recognized authorities and the like so as to ascertain compliance with the requirements of the Contract Documents.

C. Promptly notify Architect and Contractor of irregularities or deficiencies of Work which are observed during performance of services.

D. Promptly submit sufficient copies (minimum 5) of reports and tests to Architect for distribution. Reports shall contain -
   1. Issue date
   2. Project title and number
   3. Testing laboratory name and address
   4. Name and signature of inspector
   5. Date of inspection or sampling
   6. Temperature and weather observations

7. Test date
8. Identification of product and specification section
9. Location in project
10. Type of inspection or test
11. Observations regarding Contract Document compliance.

E. Perform additional services as required by the Owner and/or Architect.

F. The laboratory is not authorized to - release, revoke, alter or enlarge on, requirements of the Contract Documents; approve or accept any portion of Work; perform any duties of the Contractor.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall to the best of his ability -

1. Cooperate with laboratory personnel, provide access to the Work and to Manufacturer's operations as may be necessary.
2. Provide to the laboratory preliminary representative samples of materials to be tested in required quantities.
3. Furnish copies of mill test reports.
4. Provide casual labor and facilities as required to provide access to Work to be tested; to obtain and handle samples at the Site; to facilitate inspections and tests; for laboratory's exclusive use for storage and curing of test samples.
5. Notify laboratory sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
6. Arrange with laboratory and PAY FOR, additional sampling and testing required for the Contractor's convenience.
7. Employ, AND PAY FOR, services of a separate, equally qualified Independent Testing Laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents. Coordinate with Paragraph 1.05.A.4 above.

1.6 TESTS REQUIRED

A. General Construction Tests: More detailed testing requirements are given in individual Specification Sections. The Owner shall retain the right to make any additional tests the Architect deem necessary or appropriate. The Contractor is responsible for providing his own tests to determine that materials meet specified requirements. The scope of tests required and paid for by the Owner (unless otherwise noted below) shall include as a minimum the following:

1. Concrete Paving and General Concrete Work: Concrete mix design testing shall be paid for by Contractor. Owner reserves the right to retain and pay for his own testing for checking purposes.
2. Concrete Paving and General Concrete Work: Concrete test cylinders as specified in Section 03 30 00, Cast-in-Place Concrete. All concrete cylinder testing will be performed by the Owner’s testing laboratory at the cost of the Owner.
5. Masonry Mortar: Three cubes tested for compressive strength at 10 days; ASTM C 91 tests.

6. Metals: Strength dimension; coating thickness; bolt torque; welding X-ray or ultrasonic tests.

B. Plumbing: At least the following tests will be performed. Conform to requirements specified in individual Division 22 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor and Owner's on-site representative:
1. Water supply piping hydrostatic pressure test.
2. Sanitary piping test before fixture installation: Cap pipes and fill to highest point in system.
3. Plumbing fixture operation.

C. Fire Protection System: At least the following tests will be performed. Conform to requirements specified in individual Division 21 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor and Owner's on-site representative:
1. Fire protection system flushed and pressure tested.

D. HVAC Testing: All HVAC work shall be tested by an independent testing and balancing agency. Conform to requirements specified in individual Division 23 Specification Sections. All costs of these tests will be paid by the subcontractor. Adjustments shall be made by the subcontractor as directed by the Owner. At least the following tests will be performed:
1. Piping hydrostatic tests.
2. Air and water balancing.
3. Thermostat control monitoring and testing.
4. Boiler efficiency testing.

E. Electrical Power System Testing: At least the following tests will be performed. Conform to requirements specified in individual Division 26 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor and Owner's on-site representative:
1. Polarity tests.
2. Operation of all circuits.
3. Testing of emergency system.
4. Security systems.
5. Generation system.
6. Grounding systems.

F. Electrical Lighting System Testing: Conform to requirements specified in individual Division 26 Specification Sections. At least the following tests shall be performed and paid for by the subcontractor.
1. Operation of every component of entire system.

G. Fire Alarm System Testing: At least the following tests will be performed. Conform to requirements specified in individual Division 28 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor and Owner's on-site representative:
1. All smoke and heat detectors.
2. Proper operation as required by authorities having jurisdiction.

H. Contractor's Responsibilities: The Contractor shall notify the Owner, Architect, Construction Manager and Testing Laboratory personnel at least 48 hours prior to performance of work requiring testing. The Contractor shall fully cooperate with

testing agencies and permit free access to all areas at all times. The Contractor shall permit taking samples at any time during construction, either before or after installation. Prior to notice to proceed with construction, the Contractor shall submit a Testing Log of planned tests and scheduled test dates. Tests shall be numbered based on type of work, type of test, and sequence. The Testing Log shall be maintained by the Contractor and updated weekly.

1. Coordination: The Contractor shall coordinate all testing, including all testing and inspections to be paid for by the Owner. The Contractor will arrange testing and sampling performed by the Owner's testing agency and will have prepared test record forms. Upon receipt of test results, the Owner will distribute 2 copies to the Contractor, 2 copies to the Architect, and 2 copies to the Construction Manager with test results.

I. Follow-up and Corrective Action: The Contractor and the Owner will note the test record on the Testing Log to acknowledge test procedures and results. If the follow-up or corrective action is needed, the Contractor shall submit to the Owner, Architect and Construction Manager 2 written copies of proposed follow-up or corrective plans and obtain the Owner's written approval before proceeding.

1. Cost of Testing: If tests indicate that materials or work do not comply with requirements, the contractor shall pay for all retesting, and shall remove and replace non-complying work at no additional cost to the Owner.

J. Local Owner Inspections: The Contractor is also responsible for coordinating and cooperating with local requirements for inspections.

End of Section

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 (BCNYS)

BCNYS § 1704.1.1 requires the project Design Professional 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 Nyack Union Free School District	Building Valley Cottage ES
Project Title Nyack District Wide HVAC Reconstruction	
SED Project # 50-03-04-03-0-001-016	Project Address 26 Lake Road Valley Cottage, NY 10989
Architect/Engineer KG+D Architects, PC	
Name of Person Completing this Statement Trevor B. Hill	Phone 203 490-4140 Date 7/5/2022
Comments	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360, Section A3.3	1705.2	☑	51200
2. Inspection of high-strength bolting.	X	X	AISC 360, Section M5.6-3	1705.2	☑	51200
3. Material verification of structural steel.			AISC360 Ch. N	1705.2	☑	51200
4. Material verification of weld filler materials.			AISC 360, Ch. N	1705.2	☑	51200
5. Inspection of welding:				1705.2	☑	
a. Structural steel	X	X	AISC360 Table N5.4-1	1705.2	☑	51200
b. Reinforcing steel	X	X	AISC360 Table N5.4-1	1705.2	☑	
6. Inspection of steel frame joint details.		X	AISC360 Table N6.1	1704.3, 1704.3.2	☑	51200
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 20,25.2, 25.3, 26.6.1-26.6.3	175.3 1908.4	☐	51200
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.6.4	1704.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		Ch. N: Section N5.6 and Tables N5.6-1, N5.6-2 and N5.6-3		1705.3	☐	33000
4. Verify use of required design mix.		X	ACI 318: Ch. 19,26.4.3,26.4.4		1904.1 1904.2 1908.2 1908.3	☐	33000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1908.9	☐	33000
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.5		1904.1 1904.2 1908.2 1908.3	☐	33000
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.5.3-26.5.5		1908.9	☐	33000
8. Inspection of prestressed concrete.	X		ACI 318: 18.18.4, 18.20		1705.2	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 26.8		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		1705.3	☐	
11. Inspection of formwork		X	ACI 318: 26.11.2		1705.3	☐	33000
C. Masonry Construction							
L1 = Level 1 Inspection required for nonessential facilities.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	42000
L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		L1 & L2	Table 3.1.2.2.a. Table 3.1.2.3.d.	2.1, 2.6A, 2.6B	1705.4	☐	42000
b. Placement of masonry units and construction of mortar joints.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	42000
c. Location and placement of reinforcement, connectors, tendons, anchorages.		L1	Section 1.13 Table 3.1.2.2.d.; Table 3.1.2.3.c.	3.2E, 3.4	7105.4	☐	42000
		L2	Sec. 1.13	3.4, 3.6A	7105.4	☐	
d. Prestressing technique.		L1			7105.4	☐	
Grout space prior to grouting.	L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		L1			7105.4	☐	
Placement of grout.	L2				7105.4	☐	
f. Grout specs prior to grouting.	L2				7105.4	☐	42000
2. Inspection program shall verify:							
a. Size and location of structural elements.		L1 & L2		3.3F	1705.4	☐	42000
b. Type, size, and location of anchors.	L2	L1	Sec. 1.2.2(e), 2.1.4, 3.1.6		1705.4	☐	42000
c. Specified size, grade, and type of reinforcement.		L1 & L2	Sec. 1.13	2.4, 3.4	1705.4	☐	42000
d. Welding of reinforcing bars.	L1 & L2		2.1.7.10.2, 3.3.3.4(b)		7105.4	☐	
e. Cold/hot weather protection of masonry construction.		L1 & L2	Table 3.1.2.4.d	1.8C, 1.8D	1705.4	☐	42000
f. Prestressing force measurement and application.	L2	L1		3.6B	7105.4	☐	
3. Verification prior to grouting.		L1	1.13		1704.5	☐	42000
	L2			3.2D, 3.4, 2.6B, 3.3B 1.4	1704.5 2105.2.2, 2105.3	☐	
4. Grout placement.	L1		Table 3.1.2.3.a Table 3.1.2.1.f	3.2D, 3.2F, 3.5	1705.4	☐	42000

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
5. Preparation of grout specimens, mortar specimens, and/or prisms.	L1 & L2				1705.2	☐	
6. Compliance with documents and submittals.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	
D. Wood Construction							
1. Fabrication process of prefabricated wood structural elements and assemblies.					1704.2.5	☐	
2. High-load diaphrams designed in accordance with Table 2306.3.2			Table 2306.2		1705.5	☐	
E. Soils					1705.6	☐	
F. Pile Foundations					1705.7	☐	
G. Pier Foundations					1705.8	☐	
H. Sprayed Fire-Resistant Materials							
1. Structural member surface conditions.					1705.14.2	☐	78100
2. Application.					1705.14.3	☐	78100
3. Thickness.			ASTM E 605		1705.14.4	☐	78100
4. Density.			ASTM E 605		0705.14.5	☐	78100
5. Bond strength.			ASTM E 736		1705.14.6	☐	78100
I. Mastic and Intumescent Fire-Resistant Coatings					1705.15	☐	78123
J. Exterior Insulation and Finish Systems (EIFS)					1705.16	☐	
K. Special Cases					1705.17	☐	
L. Smoke Control					1705.18	☐	
M. Special Inspections for Seismic Resistance							
1. Structural steel.	X		AISC 341		1705.12.1	☐	
2. Structural wood.	X				1705.12.2	☐	
3. Cold-formed steel framing.		X			1705.12.3	☐	
4. Pier Foundations.		X			1705.8,1705.12	☐	
5. Storage racks and access floors.		X			1705.12.5, 1705.12.7	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
6. Architectural components.		X		1705.12.5	☐	
7. Mechanical and electrical components.		X		1705.12.6	☐	
8. Designated seismic system verifications				1705.13.3	☐	
9. Seismic isolation system.		X		1705.13.4	☐	
N. Structural Testing for Seismic Resistance						
1. Testing and verification of masonry materials and assemblies prior to construction.				1705.13.2	☐	
2. Testing for seismic resistance.				1705.13	☐	
3. Reinforcing and prestressing steel.			ACI 318	1705.13	☐	
4. Structural steel.			AISC 341, AWS D1.1	1705.13	☐	
5. Seismic qualification of mechanical and electrical equipment.				1705	☐	
6. Seismically isolated structures.			Section 17.8 of ASCE 7	1705.13.4	☐	
O. Structural Observations						
1. Seismic resistance.				1704.6	☐	
2. Wind requirements.				1704.6	☐	
P. Test Safe Load				1707	☐	
Q. In-Situ Load Tests				1708	☐	
R. Preconstruction Load Tests				1709	☐	
S. Other (list)						

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 (BCNYS)

BCNYS § 1704.1.1 requires the project Design Professional 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 Nyack Union Free School District	Building Liberty Elementary School
Project Title Nyack District Wide HVAC Reconstruction	
SED Project # 50-03-04-03-0-006-016	Project Address 142 Lake Road, Valley Cottage, NY 10989
Architect/Engineer KG+D Architects, PC	
Name of Person Completing this Statement Trevor B. Hill	Phone 203 490-4140 Date 7/5/2022
Comments	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360, Section A3.3	1705.2	☑	51200
2. Inspection of high-strength bolting.	X	X	AISC 360, Section M5.6-3	1705.2	☑	51200
3. Material verification of structural steel.			AISC360 Ch. N	1705.2	☑	51200
4. Material verification of weld filler materials.			AISC 360, Ch. N	1705.2	☑	51200
5. Inspection of welding:				1705.2	☑	
a. Structural steel	X	X	AISC360 Table N5.4-1	1705.2	☑	51200
b. Reinforcing steel	X	X	AISC360 Table N5.4-1	1705.2	☑	
6. Inspection of steel frame joint details.		X	AISC360 Table N6.1	1704.3, 1704.3.2	☑	51200
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 20,25.2, 25.3, 26.6.1-26.6.3	175.3 1908.4	☐	51200
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.6.4	1704.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		Ch. N: Section N5.6 and Tables N5.6-1, N5.6-2 and N5.6-3		1705.3	☐	33000
4. Verify use of required design mix.		X	ACI 318: Ch. 19,26.4.3,26.4.4		1904.1 1904.2 1908.2 1908.3	☐	33000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1908.9	☐	33000
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.5		1904.1 1904.2 1908.2 1908.3	☐	33000
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.5.3-26.5.5		1908.9	☐	33000
8. Inspection of prestressed concrete.	X		ACI 318: 18.18.4, 18.20		1705.2	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 26.8		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		1705.3	☐	
11. Inspection of formwork		X	ACI 318: 26.11.2		1705.3	☐	33000
C. Masonry Construction							
L1 = Level 1 Inspection required for nonessential facilities.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	42000
L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		L1 & L2	Table 3.1.2.2.a. Table 3.1.2.3.d.	2.1, 2.6A, 2.6B	1705.4	☐	42000
b. Placement of masonry units and construction of mortar joints.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	42000
c. Location and placement of reinforcement, connectors, tendons, anchorages.		L1	Section 1.13 Table 3.1.2.2.d.; Table 3.1.2.3.c.	3.2E, 3.4	7105.4	☐	42000
		L2	Sec. 1.13	3.4, 3.6A	7105.4	☐	
d. Prestressing technique.		L1			7105.4	☐	
Grout space prior to grouting.	L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		L1			7105.4	☐	
Placement of grout.	L2				7105.4	☐	
f. Grout specs prior to grouting.	L2				7105.4	☐	42000
2. Inspection program shall verify:							
a. Size and location of structural elements.		L1 & L2		3.3F	1705.4	☐	42000
b. Type, size, and location of anchors.	L2	L1	Sec. 1.2.2(e), 2.1.4, 3.1.6		1705.4	☐	42000
c. Specified size, grade, and type of reinforcement.		L1 & L2	Sec. 1.13	2.4, 3.4	1705.4	☐	42000
d. Welding of reinforcing bars.	L1 & L2		2.1.7.10.2, 3.3.3.4(b)		7105.4	☐	
e. Cold/hot weather protection of masonry construction.		L1 & L2	Table 3.1.2.4.d	1.8C, 1.8D	1705.4	☐	42000
f. Prestressing force measurement and application.	L2	L1		3.6B	7105.4	☐	
3. Verification prior to grouting.		L1	1.13		1704.5	☐	42000
	L2			3.2D, 3.4, 2.6B, 3.3B 1.4	1704.5 2105.2.2, 2105.3	☐	
4. Grout placement.	L1		Table 3.1.2.3.a Table 3.1.2.1.f	3.2D, 3.2F, 3.5	1705.4	☐	42000

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
5. Preparation of grout specimens, mortar specimens, and/or prisms.	L1 & L2				1705.2	☐	
6. Compliance with documents and submittals.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	
D. Wood Construction							
1. Fabrication process of prefabricated wood structural elements and assemblies.					1704.2.5	☐	
2. High-load diaphrams designed in accordance with Table 2306.3.2			Table 2306.2		1705.5	☐	
E. Soils					1705.6	☐	
F. Pile Foundations					1705.7	☐	
G. Pier Foundations					1705.8	☐	
H. Sprayed Fire-Resistant Materials							
1. Structural member surface conditions.					1705.14.2	☐	78100
2. Application.					1705.14.3	☐	78100
3. Thickness.			ASTM E 605		1705.14.4	☐	78100
4. Density.			ASTM E 605		0705.14.5	☐	78100
5. Bond strength.			ASTM E 736		1705.14.6	☐	78100
I. Mastic and Intumescent Fire-Resistant Coatings					1705.15	☐	78123
J. Exterior Insulation and Finish Systems (EIFS)					1705.16	☐	
K. Special Cases					1705.17	☐	
L. Smoke Control					1705.18	☐	
M. Special Inspections for Seismic Resistance							
1. Structural steel.	X		AISC 341		1705.12.1	☐	
2. Structural wood.	X				1705.12.2	☐	
3. Cold-formed steel framing.		X			1705.12.3	☐	
4. Pier Foundations.		X			1705.8,1705.12	☐	
5. Storage racks and access floors.		X			1705.12.5, 1705.12.7	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
6. Architectural components.		X		1705.12.5	☐	
7. Mechanical and electrical components.		X		1705.12.6	☐	
8. Designated seismic system verifications				1705.13.3	☐	
9. Seismic isolation system.		X		1705.13.4	☐	
N. Structural Testing for Seismic Resistance						
1. Testing and verification of masonry materials and assemblies prior to construction.				1705.13.2	☐	
2. Testing for seismic resistance.				1705.13	☐	
3. Reinforcing and prestressing steel.			ACI 318	1705.13	☐	
4. Structural steel.			AISC 341, AWS D1.1	1705.13	☐	
5. Seismic qualification of mechanical and electrical equipment.				1705	☐	
6. Seismically isolated structures.			Section 17.8 of ASCE 7	1705.13.4	☐	
O. Structural Observations						
1. Seismic resistance.				1704.6	☐	
2. Wind requirements.				1704.6	☐	
P. Test Safe Load				1707	☐	
Q. In-Situ Load Tests				1708	☐	
R. Preconstruction Load Tests				1709	☐	
S. Other (list)						

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 (BCNYS)

BCNYS § 1704.1.1 requires the project Design Professional 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 Nyack Union Free School District	Building Nyack Middle School
Project Title Nyack District Wide HVAC Reconstruction	
SED Project # 50-03-04-03-0-004-020	Project Address 98 South Highland Ave. Nyack, NY 10960
Architect/Engineer KG+D Architects, PC	
Name of Person Completing this Statement Trevor B. Hill	Phone 203 490-4140 Date 7/5/2022
Comments	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360, Section A3.3	1705.2	☑	51200
2. Inspection of high-strength bolting.	X	X	AISC 360, Section M5.6-3	1705.2	☑	51200
3. Material verification of structural steel.			AISC360 Ch. N	1705.2	☑	51200
4. Material verification of weld filler materials.			AISC 360, Ch. N	1705.2	☑	51200
5. Inspection of welding:				1705.2	☑	
a. Structural steel	X	X	AISC360 Table N5.4-1	1705.2	☑	51200
b. Reinforcing steel	X	X	AISC360 Table N5.4-1	1705.2	☑	
6. Inspection of steel frame joint details.		X	AISC360 Table N6.1	1704.3, 1704.3.2	☑	51200
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 20,25.2, 25.3, 26.6.1-26.6.3	175.3 1908.4	☐	51200
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.6.4	1704.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		Ch. N: Section N5.6 and Tables N5.6-1, N5.6-2 and N5.6-3		1705.3	☐	33000
4. Verify use of required design mix.		X	ACI 318: Ch. 19,26.4.3,26.4.4		1904.1 1904.2 1908.2 1908.3	☐	33000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1908.9	☐	33000
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.5		1904.1 1904.2 1908.2 1908.3	☐	33000
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.5.3-26.5.5		1908.9	☐	33000
8. Inspection of prestressed concrete.	X		ACI 318: 18.18.4, 18.20		1705.2	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 26.8		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		1705.3	☐	
11. Inspection of formwork		X	ACI 318: 26.11.2		1705.3	☐	33000
C. Masonry Construction							
L1 = Level 1 Inspection required for nonessential facilities.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	42000
L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		L1 & L2	Table 3.1.2.2.a. Table 3.1.2.3.d.	2.1, 2.6A, 2.6B	1705.4	☐	42000
b. Placement of masonry units and construction of mortar joints.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	42000
c. Location and placement of reinforcement, connectors, tendons, anchorages.		L1	Section 1.13 Table 3.1.2.2.d.; Table 3.1.2.3.c.	3.2E, 3.4	7105.4	☐	42000
		L2	Sec. 1.13	3.4, 3.6A	7105.4	☐	
d. Prestressing technique.		L1			7105.4	☐	
Grout space prior to grouting.	L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		L1			7105.4	☐	
Placement of grout.	L2				7105.4	☐	
f. Grout specs prior to grouting.	L2				7105.4	☐	42000
2. Inspection program shall verify:							
a. Size and location of structural elements.		L1 & L2		3.3F	1705.4	☐	42000
b. Type, size, and location of anchors.	L2	L1	Sec. 1.2.2(e), 2.1.4, 3.1.6		1705.4	☐	42000
c. Specified size, grade, and type of reinforcement.		L1 & L2	Sec. 1.13	2.4, 3.4	1705.4	☐	42000
d. Welding of reinforcing bars.	L1 & L2		2.1.7.10.2, 3.3.3.4(b)		7105.4	☐	
e. Cold/hot weather protection of masonry construction.		L1 & L2	Table 3.1.2.4.d	1.8C, 1.8D	1705.4	☐	42000
f. Prestressing force measurement and application.	L2	L1		3.6B	7105.4	☐	
3. Verification prior to grouting.		L1	1.13		1704.5	☐	42000
	L2			3.2D, 3.4, 2.6B, 3.3B 1.4	1704.5 2105.2.2, 2105.3	☐	
4. Grout placement.	L1		Table 3.1.2.3.a Table 3.1.2.1.f	3.2D, 3.2F, 3.5	1705.4	☐	42000

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
5. Preparation of grout specimens, mortar specimens, and/or prisms.	L1 & L2				1705.2	☐	
6. Compliance with documents and submittals.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	
D. Wood Construction							
1. Fabrication process of prefabricated wood structural elements and assemblies.					1704.2.5	☐	
2. High-load diaphrams designed in accordance with Table 2306.3.2			Table 2306.2		1705.5	☐	
E. Soils					1705.6	☐	
F. Pile Foundations					1705.7	☐	
G. Pier Foundations					1705.8	☐	
H. Sprayed Fire-Resistant Materials							
1. Structural member surface conditions.					1705.14.2	☐	78100
2. Application.					1705.14.3	☐	78100
3. Thickness.			ASTM E 605		1705.14.4	☐	78100
4. Density.			ASTM E 605		0705.14.5	☐	78100
5. Bond strength.			ASTM E 736		1705.14.6	☐	78100
I. Mastic and Intumescent Fire-Resistant Coatings					1705.15	☐	78123
J. Exterior Insulation and Finish Systems (EIFS)					1705.16	☐	
K. Special Cases					1705.17	☐	
L. Smoke Control					1705.18	☐	
M. Special Inspections for Seismic Resistance							
1. Structural steel.	X		AISC 341		1705.12.1	☐	
2. Structural wood.	X				1705.12.2	☐	
3. Cold-formed steel framing.		X			1705.12.3	☐	
4. Pier Foundations.		X			1705.8,1705.12	☐	
5. Storage racks and access floors.		X			1705.12.5, 1705.12.7	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
6. Architectural components.		X		1705.12.5	☐	
7. Mechanical and electrical components.		X		1705.12.6	☐	
8. Designated seismic system verifications				1705.13.3	☐	
9. Seismic isolation system.		X		1705.13.4	☐	
N. Structural Testing for Seismic Resistance						
1. Testing and verification of masonry materials and assemblies prior to construction.				1705.13.2	☐	
2. Testing for seismic resistance.				1705.13	☐	
3. Reinforcing and prestressing steel.			ACI 318	1705.13	☐	
4. Structural steel.			AISC 341, AWS D1.1	1705.13	☐	
5. Seismic qualification of mechanical and electrical equipment.				1705	☐	
6. Seismically isolated structures.			Section 17.8 of ASCE 7	1705.13.4	☐	
O. Structural Observations						
1. Seismic resistance.				1704.6	☐	
2. Wind requirements.				1704.6	☐	
P. Test Safe Load				1707	☐	
Q. In-Situ Load Tests				1708	☐	
R. Preconstruction Load Tests				1709	☐	
S. Other (list)						

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 (BCNYS)

BCNYS § 1704.1.1 requires the project Design Professional 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 Nyack Union Free School District	Building Upper Nyack ES
Project Title Nyack District Wide HVAC Reconstruction	
SED Project # 50-03-04-03-0-007-023	Project Address 336 North Broadway Upper Nyack, NY 10960
Architect/Engineer KG+D Architects, PC	
Name of Person Completing this Statement Trevor B. Hill	Phone 203 490-4140 Date 7/5/2022
Comments	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360, Section A3.3	1705.2	☑	51200
2. Inspection of high-strength bolting.	X	X	AISC 360, Section M5.6-3	1705.2	☑	51200
3. Material verification of structural steel.			AISC360 Ch. N	1705.2	☑	51200
4. Material verification of weld filler materials.			AISC 360, Ch. N	1705.2	☑	51200
5. Inspection of welding:				1705.2	☑	
a. Structural steel	X	X	AISC360 Table N5.4-1	1705.2	☑	51200
b. Reinforcing steel	X	X	AISC360 Table N5.4-1	1705.2	☑	
6. Inspection of steel frame joint details.		X	AISC360 Table N6.1	1704.3, 1704.3.2	☑	51200
B. Concrete Construction						
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: 20,25.2, 25.3, 26.6.1-26.6.3	175.3 1908.4	☐	51200
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.6.4	1704.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		Ch. N: Section N5.6 and Tables N5.6-1, N5.6-2 and N5.6-3		1705.3	☐	33000
4. Verify use of required design mix.		X	ACI 318: Ch. 19,26.4.3,26.4.4		1904.1 1904.2 1908.2 1908.3	☐	33000
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 5.6, 5.8		1908.9	☐	33000
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.5		1904.1 1904.2 1908.2 1908.3	☐	33000
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.5.3-26.5.5		1908.9	☐	33000
8. Inspection of prestressed concrete.	X		ACI 318: 18.18.4, 18.20		1705.2	☐	
9. Erection of precast concrete members.		X	ACI 318: Ch. 26.8		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		1705.3	☐	
11. Inspection of formwork		X	ACI 318: 26.11.2		1705.3	☐	33000
C. Masonry Construction							
L1 = Level 1 Inspection required for nonessential facilities.			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	42000
L2 = Level 2 Inspection required for essential facilities. In general, schools are not considered essential facilities unless they are a designated emergency shelter			ACI 530/ ASCE 5/TMS 402, Ch. 35	ACI 530.1/ ASCE 6/TMS 602, Ch. 35	1705.4	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
1. Verify to ensure compliance:							
a. Proportions of site prepared mortar and grout.		L1 & L2	Table 3.1.2.2.a. Table 3.1.2.3.d.	2.1, 2.6A, 2.6B	1705.4	☐	42000
b. Placement of masonry units and construction of mortar joints.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	42000
c. Location and placement of reinforcement, connectors, tendons, anchorages.		L1	Section 1.13 Table 3.1.2.2.d.; Table 3.1.2.3.c.	3.2E, 3.4	7105.4	☐	42000
		L2	Sec. 1.13	3.4, 3.6A	7105.4	☐	
d. Prestressing technique.		L1			7105.4	☐	
Grout space prior to grouting.	L2				1705.4	☐	
e. Grade and size of prestressing tendons and anchorages.		L1			7105.4	☐	
Placement of grout.	L2				7105.4	☐	
f. Grout specs prior to grouting.	L2				7105.4	☐	42000
2. Inspection program shall verify:							
a. Size and location of structural elements.		L1 & L2		3.3F	1705.4	☐	42000
b. Type, size, and location of anchors.	L2	L1	Sec. 1.2.2(e), 2.1.4, 3.1.6		1705.4	☐	42000
c. Specified size, grade, and type of reinforcement.		L1 & L2	Sec. 1.13	2.4, 3.4	1705.4	☐	42000
d. Welding of reinforcing bars.	L1 & L2		2.1.7.10.2, 3.3.3.4(b)		7105.4	☐	
e. Cold/hot weather protection of masonry construction.		L1 & L2	Table 3.1.2.4.d	1.8C, 1.8D	1705.4	☐	42000
f. Prestressing force measurement and application.	L2	L1		3.6B	7105.4	☐	
3. Verification prior to grouting.		L1	1.13		1704.5	☐	42000
	L2			3.2D, 3.4, 2.6B, 3.3B 1.4	1704.5 2105.2.2, 2105.3	☐	
4. Grout placement.	L1		Table 3.1.2.3.a Table 3.1.2.1.f	3.2D, 3.2F, 3.5	1705.4	☐	42000

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
5. Preparation of grout specimens, mortar specimens, and/or prisms.	L1 & L2				1705.2	☐	
6. Compliance with documents and submittals.		L1 & L2	Table 3.1.2.4.a	3.3F	1705.4	☐	
D. Wood Construction							
1. Fabrication process of prefabricated wood structural elements and assemblies.					1704.2.5	☐	
2. High-load diaphrams designed in accordance with Table 2306.3.2			Table 2306.2		1705.5	☐	
E. Soils					1705.6	☐	
F. Pile Foundations					1705.7	☐	
G. Pier Foundations					1705.8	☐	
H. Sprayed Fire-Resistant Materials							
1. Structural member surface conditions.					1705.14.2	☐	78100
2. Application.					1705.14.3	☐	78100
3. Thickness.			ASTM E 605		1705.14.4	☐	78100
4. Density.			ASTM E 605		0705.14.5	☐	78100
5. Bond strength.			ASTM E 736		1705.14.6	☐	78100
I. Mastic and Intumescent Fire-Resistant Coatings					1705.15	☐	78123
J. Exterior Insulation and Finish Systems (EIFS)					1705.16	☐	
K. Special Cases					1705.17	☐	
L. Smoke Control					1705.18	☐	
M. Special Inspections for Seismic Resistance							
1. Structural steel.	X		AISC 341		1705.12.1	☐	
2. Structural wood.	X				1705.12.2	☐	
3. Cold-formed steel framing.		X			1705.12.3	☐	
4. Pier Foundations.		X			1705.8,1705.12	☐	
5. Storage racks and access floors.		X			1705.12.5, 1705.12.7	☐	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
6. Architectural components.		X		1705.12.5	☐	
7. Mechanical and electrical components.		X		1705.12.6	☐	
8. Designated seismic system verifications				1705.13.3	☐	
9. Seismic isolation system.		X		1705.13.4	☐	
N. Structural Testing for Seismic Resistance						
1. Testing and verification of masonry materials and assemblies prior to construction.				1705.13.2	☐	
2. Testing for seismic resistance.				1705.13	☐	
3. Reinforcing and prestressing steel.			ACI 318	1705.13	☐	
4. Structural steel.			AISC 341, AWS D1.1	1705.13	☐	
5. Seismic qualification of mechanical and electrical equipment.				1705	☐	
6. Seismically isolated structures.			Section 17.8 of ASCE 7	1705.13.4	☐	
O. Structural Observations						
1. Seismic resistance.				1704.6	☐	
2. Wind requirements.				1704.6	☐	
P. Test Safe Load				1707	☐	
Q. In-Situ Load Tests				1708	☐	
R. Preconstruction Load Tests				1709	☐	
S. Other (list)						

SECTION 014339 - MOCKUP REQUIREMENTS

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. General Purpose of Mockups

B. Miscellaneous Mockups

1.3 GENERAL PURPOSE OF MOCKUPS

A. Contractors are advised that various sections of the Specifications require construction of mockups. Where mockups are required the Contractor erecting the mockup shall notify the Architect one week prior to its completion.

B. The purpose of each mockup will be to establish minimum standards of materials and workmanship and to assure that completed installations based on the mockups will be fully functional and will serve the purpose for which they have been designed.

C. Approved mockups may be left in place and incorporated into the permanent installation.

D. The Contractor shall not proceed with the purchase or fabrication of any "mockup" items until the procedure of mockup erection, inspection and approval is completed and documented.

E. Contractor shall coordinate work at each mockup with other trades construction that mockup.

1.4 MISCELLANEOUS MOCKUPS

A. Field mockups for work are required as noted within the technical specifications and generally include work identified within said sections.

Failure to list any required mockup will not relieve the Contractor from executing said mockup.

End of Section

SECTION 015713 - TEMPORARY EROSION AND SEDIMENT CONTROL

Part 1 - GENERAL

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2 REQUIRMENTS INCLUDED

A. Responsibility
B. Description
C. Submittals
D. Definitions
E. Reference Standards
F. Federal Permit Notifications
G. Authority
H. Coordination and Scheduling
I. Sustainability

1.3 RESPONSIBILITY

A. Assume responsibility for the temporary control of soil erosion and water pollution resulting from performance of the work of this contract.

B. Measures to avoid and minimize waterborne soil erosion during construction and to minimize off-site discharge or tracking of sediment during construction.

C. The Contractor shall be responsible to perform all tasks and to erect, manage, maintain, move, extend, and remove at the proper time all physical erosion and sediment control measures from beginning of construction activities through final completion. Unless otherwise noted in the contract documents, such activities are considered as part of the base bid.

D. In the event of conflict between these specifications and the regulation of other Federal, State, or local jurisdictions, the more restrictive regulations shall apply.

E. The Contractor shall engage services of a Certified Professional in Erosion and Sediment Control (EPESC) or a licensed professional engineer to conduct regular inspections at least once every seven calendar days and within 24 hours after each storm producing 0.5 inches of rainfall or greater.

1.4 DESCRIPTION

A. The Work shall consist of temporary control measures as required to provide temporary control of soil erosion or water pollution and work in conjunction with technical specifications, specifically:.

1. Division 31 - Earthwork

B. Temporary measures shall include silt fences, inlet protections, berms, sedimentation basins, silt screens, mulches, grasses, or other erosion control devices or methods as required.

1.5 SUBMITTALS

A. Outline description of erosion and sediment containment program complete with implementation drawings if requested; coordinate with requirements set forth in Section 01 57 13.
B. Material samples and product data as applicable to the particular products.
C. Material safety data sheets on all products, as necessary.

1.6 DEFINITIONS

A. Erosion: The action of loosening and waterborne transport of soil particles from bare soil surfaces on construction sites as a result of rainfall or runoff. Erosion can occur as splash erosion, sheet erosion, rills, gullies, or channel erosion.
B. Sediment: The accumulation of eroded soil particles in streams, ponds, ditches, and other areas downstream from the construction site.
C. Stabilization: Disturbed earthen surfaces are considered stable when 75% of the intended vegetation has been established, in the opinion of the Engineer.

1.7 REFERENCE STANDARDS

A. "Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites", by U.S. EPA.
B. "Field Manual on Sediment and Erosion Control Best Management Practices for Contractors and Inspectors", by Jerald S. Fifield, Ph.D., CPESC.
C. National Menu of Stormwater Best Management Practices on USEPA website,http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm.
D. Item #4 entitled "Construction - BMPS for MS4's and construction site operators to address stormwater runoff from active construction sites."

1.8 FEDERAL PERMIT NOTIFICATION

A. For all construction sites involving disturbance of one acre or more, the Contractor must complete and file a "Notice of Intent for Stormwater Discharges Associated with Construction Activity Under a NPDES Permit" form (NOI) with the U.S. Environmental Protection Agency (EPA).
B. As a condition of the federal permit, the Contractor must prepare, maintain, and continually update a Storm Water Pollution Prevention Plan (SWPPP) throughout the construction process. The Plan and associated documentation must be on-site during all periods of construction.
    1. A meeting with the Contractor, Owner, and Engineer shall be held prior to start of work to review the requirements for construction phase stormwater management. This may be concurrent with the overall preconstruction conference.
        a. If the Contractor employs a consultant to prepare the SWPPP, the

consultant shall also be in attendance.

2. The SWPPP must be specific to the particular project, and not a "generic" concept. It must be consistent with the Contractor's proposed schedule for the project.
3. The SWPPP must show the location of current temporary erosion and sediment control measures, including but not limited to: site perimeter protection, surface and slope protection, channel protection, inlet and outlet protection, construction traffic exit protection, stockpile protection, etc. It must also show flow arrows, discharge points, and construction phasing. It is expected that as construction proceeds, the SWPPP will be updated continually to depict the current locations of all erosion and sediment control measures.

C. As a further condition of the federal permit, the Contractor must regularly inspect all erosion and sediment control measures and the site in general, and keep a record of inspections on-site. The inspections must be performed by the Contractor's superintendent or responsible designee. It must note conditions and maintenance measures performed. Dated photographs are encouraged as part of the log.
1. Inspections must be performed weekly and within 24 hours after each rainfall event exceeding one-half inch.
2. Contractor shall employ a rain gauge on-site and record daily results for the duration of construction.
3. Contractors are encouraged to use the form "Stormwater Control Site Inspection Report", referenced in Appendix B of the EPA manual in Paragraph 1.03.A, above.
4. The Contractor shall be prepared to show the current SWPPP, the inspection record, and a copy of the NOI form to authorized EPA inspection personnel if the site is visited by them, and to escort the inspector around the construction site. Such inspections may occur unannounced at any time.

D. At completion of construction and/or when all earth surfaces are stabilized from erosion, the Contractor shall complete a "Notice of Termination" (NOT) form with EPA.

E. The Contractor must maintain a file of all SWPPP activities and records for three (3) years after filing the NOT, or as required by EPA, whichever is longer.

1.9 AUTHORITY

A. The Construction Manager, Owner and/or Architect has the authority to limit the surface area of erodible earth exposed by earthwork operations and to direct the Contractor to provide immediate temporary or permanent erosion or pollution control measures to minimize damage to property and contamination of watercourses and water impoundments.

1.10 COORDINATION AND SCHEDULING

A. Schedule the work so as to minimize the time that raw earth areas will be exposed to erosive conditions.

B. Coordinate the use of temporary controls with the permanent erosion control features or finish materials shown.
C. Incorporate permanent control features into the work at the earliest practical time.

1.11 SUSTAINABILITY
A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
1. Water based.
2. Water-soluble.
3. Can be cleaned up with water.
4. Non-flammable.
5. Biodegradable.
6. Low or preferably no Volatile Organic Compound (VOC) content.
7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
8. Manufactured without compounds that contribute to smog in the lower atmosphere.
9. Do not contain methylene-chloride.
10. Do not contain chlorinated hydrocarbons.
11. Contains the least possible of post-consumer or post-industrial waste.

PART 2 - MATERIALS

2.1 SILT FENCE
A. Filter fabric for silt fence shall consist of pervious sheets of woven polypropylene, nylon, or polyester with or without wire mesh reinforcing. Material shall meet the following requirements:

PHYSICAL REQUIREMENTS FOR FABRIC SILT FENCE		
Property	Test Method	Requirement
Grab Tensile Strength	ASTM D-4632	100 lbs. min.
Grab Tensile Elongation	ASTM D-4632	25% max.
Puncture Strength	ASTM D-4833	60 lbs. min.
Mullen Burst Strength	ASTM D-3786	210 psi min.
Trapezoid Tear Strength	ASTM D-4533	60 lbs. min.

NOTE: The filter fabric shall contain a stabilizer and/or inhibitors to make the filaments resistant to deterioration resulting from exposure to sunlight or heat to provide a minimum of twelve (12) months of expected usable construction life at a temperature range of 0 deg. to 120 deg. F. The filter fabric shall be a minimum of 36 inches wide, cut from a continuous roll to finish fence length to avoid the use of seams. Splice filter fabric together only when absolutely necessary and only at a support post, with a minimum 6-inch overlap and securely sealed. The filter fabric shall be free of defects or flaws which significantly affect its physical

and/or filtering properties.

B. Posts shall be of wood or steel of length in conformance to state regulations. Wood posts shall be sound quality hardwood, nominal 1 x 1 inch. Steel posts shall be round or U, T, or C-shaped with a minimum weight of one pound per foot, and have projections for fastening the wire to the fence. Max post spacing shall be in conformance with state regulations.

C. Prefabricated silt fencing, including pre-attached posts, etc. shall be permissible and shall be one of the following or approved equal:
   1. Marafi Inc/Carlisle – “Envirofence System"
   2. Akzo Nobel – “Enkamat System"
   3. Webtec, Inc. – “EconoFence"

2.2 MULCH

A. Temporary mulch may be straw, hay, wood fiber or wood cellulose, wood chips or bark chips reasonably clean and free of noxious weeds and materials toxic to plant growth.

2.3 STONE FOR CHECK DAMS AND CONSTRUCTION EXITS

A. Stone for check dams in channels and ditches and for construction exits shall be well graded angular 2-in. to 3-in. crushed stone.

2.4 EROSION CONTROL BLANKET FOR SLOPE PROTECTION

A. Type A erosion control blanket shall be a 100% straw matrix stitch-bonded with degradable thread to a single standard photodegradable polypropylene netting. North American Green S75, or equal.

B. Type B erosion control blanket shall be a 100% straw matrix stitch-bonded with degradable thread between two standard photodegradable polypropylene nettings. North American Green S150, or equal.

C. Type C erosion control blanket shall be a matrix of 70% straw and 30% coconut fibers stitch-bonded between a UV-stabilized polypropylene top netting and standard polypropylene bottom netting. North American Green SC150, or equal.

D. Type D erosion control blanket shall be a 100% coconut fiber matrix stitched between two UV stabilized polypropylene nettings. North American Green C125, or equal.

E. Equal products to those named above shall be manufactured by:
   1. Erosion Control Systems (1020).
   2. Synthetic Industries ("Polyjute").
   3. Webtec, Inc. (TerraJute).
   4. American Excelsior (Curlex).

2.5 CATCH BASIN SEDIMENT TRAPS (FILTER BAGS) FOR INLET PROTECTION

A. Sediment traps shall be manufactured to fit into the opening of a catch basin or drop inlet and hang down below the grate. Traps shall be manufactured from geotextile and stitched webbing. They shall be designed to trap grit, debris, and soil particles, yet pass water freely.

B. Sediment traps shall be equipped with lifting straps and loops for 1" rebar to set

in place. They shall not rely on the grate to stay in place.

C. Physical requirements shall be as follows:

Property	Requirement
Grab Tensile Strength, ASTM D-4632	300 lb. min.
Grab Tensile Elongation, ASTM D-4632	20% max.
Puncture, ASTM D-4833	120 lb. min.
Mullen Burst, ASTM D-3786	800 psi min.
Apparent Size Opening, ASTM D-4751	#40
Flow Rate, ASTM D-4491	40 gpm/sf

D. Sediment traps shall be designed to be cleaned and re-issued multiple times.
E. Catch basin sediment traps shall be "Silt Sack", or equal.
F. Placing a flat piece of geotextile under the grate is not acceptable.

2.6 FILTER LOGS (WATTLES)

A. Filter logs (also known as wattles) shall be used to slow runoff, promote vegetation, retard erosion, and hold sediments. Filter logs may be used for check dams in swales, on fresh embankment, as an alternate to catch basin sediment traps, or other similar functions.
B. Filter logs shall be flexible and roughly cylindrical in shape, 9" nominal diameter, and 25' nominal length.
C. Filter logs shall be made from decorticated flax fiber in either photodegradable polypropylene netting or high strength biodegradable netting.
D. Filter logs shall be staked in place with 1" x 1" x 24" wood stakes.

2.7 HAY BALES

A. Hay bales shall consist of hay from acceptable grasses and legumes, free from weeds, reeds, twigs, chaff, debris, other objectionable material or excessive amounts of seeds and grain. Hay shall be free from rot or mold and the moisture content shall not exceed fifteen (15) percent by weight at the time of weighing.
B. The hay shall be securely baled with wire of adequate size to allow for possible rusting while in use and to permit re-handling when the bale is in a saturated condition.
C. Individual bales shall be of a longitudinal shape not exceeding one hundred (100) pounds when weighed.

PART 3 - EXECUTION

3.1 WORK AREAS

A. The Architect may limit the area of clearing and grubbing and earthwork operations in progress commensurate with the Contractor's demonstrated capability in protecting erodible earth surfaces with temporary or permanent erosion control measures.

3.2 SEDIMENTATION AND EROSION CONTROL

A. The Contractor shall plan and execute all operations, particularly those

associated with excavation and backfilling, in such a manner as to minimize the amount of excavated and exposed fill or other foreign material that is washed or otherwise carried into wetlands and waterways.

B. The Contractor shall furnish and place silt fence, mulch, check dams, matting, sediment traps, wattles, hay bales, and other materials necessary for sedimentation and erosion control in accordance with the accepted SWPPP.

C. Install erosion control measures as shown on the details and sections in the plans, and follow manufacturer's recommendations.

D. In the event the measures used by the Contractor prove to be inadequate as determined by the Engineer or regulatory agents, the Contractor shall adjust his operations to the extent necessary.

E. The Contractor shall keep streams, brooks and other water crossings clear of mud, silt, debris and other objectionable materials resulting from construction operations.

F. The Contractor shall minimize the amount of bare earth exposed at any one time during construction, and minimize the duration of exposure. In general, permanent vegetation shall be established as soon as possible, including temporary vegetation as needed. Excavated material to be stockpiled for reuse shall be stored away from brooks, streams and wetland areas and protected.

G. On sloping terrain, if necessary in addition to erosion control matting, install wattles or hay bales to retard erosion paths until vegetation has become established. Do not backdrag or smear sloping surfaces. Roughen soil on slopes by mechanical means. Track marks from tracked vehicles must be perpendicular to the slope, to avoid formation of rills.

H. Sediment laden water that is being pumped from the trenches or excavations shall not be pumped directly into water courses. Employ temporary sediment traps as per the accepted SWPPP.

I. Divert flow from upland areas away from fresh slopes until stabilized.

J. Follow specifications for turf establishment through the stabilization period. Remove any erosion control measures as they become unnecessary, or interfere with turf maintenance and mowing.

3.3 PERIMETER PROTECTION

A. The Contractor shall install barriers to prevent sediment transport beyond the perimeter of each successive work area involving disturbed soil or stockpiling of erodible materials.

B. Generally, barriers shall be silt fences, but many also include hay bales, filter logs, and other measures.

C. Install and embed silt fence as per details on the drawings.

D. Replace deteriorated or damaged silt fencing, and remove sediment when it reaches the one-third point.

3.4 SURFACE AND SLOPE PROTECTION

A. Finished grade for all portions of the project will be protected from erosion immediately upon loaming and seeding.

B. All surfaces flatter than 4:1 shall be protected with a generous layer of mulch.

Material shall be held in place via repeated passes with a tracked vehicle and/or a suitable non-toxic tackifier. Machine or hand placement is acceptable.

C. Install erosion control blanket on slopes in accordance with the following table:

Slope Range	Blanket Type
3.9:1 to 3.0:1	A
2.9:1 to 2.0:1	B
1.9:1 to 1.5:1	C
1.4:1 to 1:1	D

3.5 CHANNEL PROTECTION

A. For constructed vegetated channels and ditches, protect from erosion with stone check dams until growth of vegetation.
B. Height of dam should be less than the level at which ponded water will overtop the channel.
C. Place stone check dams at spaces such that the top of the downstream dam is level with the toe of the upstream dam.
D. Supplement check dams with Type C or D erosion control matting if necessary to stop erosion.
E. Remove check dams upon stable growth of vegetation.

3.6 OUTLET PROTECTION

A. Prior to allowing flow through storm drains, install permanent stone outlet aprons at all point discharges as shown on the plans.
B. Protect outlets of minor pipes which do not have permanent outlet aprons with hay bales, wattles, and/or stone until soil stabilization.

3.7 INLET PROTECTION

A. Install means to intercept any muddy runoff from fouling existing and constructed storm drain inlets which are downstream from construction activities (e.g., catch basins, culvert inlets, etc.). Use any or all of the following methods, sufficient to prevent escape of sediment.
    1. Fabric and Stone Filter Method: This method employs a wire mesh placed over an inlet grate to support a layer of crushed stone wrapped in geotextile. See detail on plans.
    2. Filter Log Method: Place one or more rings of filter logs around the perimeter of grate or culvert inlet. Secure with stakes or pins. See detail on plans.
    3. Filter Bag Method: Install removable, cleanable filter bag under grate of catch basin. Use this method particularly for existing catch basins in pavement. See detail on plans. Geotextile fabric stuffed under the grate is not acceptable.

3.8 CONSTRUCTION EXITS

A. Construct means to retard off-site tracking of mud or dirt at all points where vehicles leave the site onto paved drives, streets, and highways.
B. Basic method shall employ geotextile fabric for stabilization under a layer of

crushed stone, with a mountable berm near the exit end. See detail on plans.

C. Contractor shall lengthen the installation beyond the minimum if necessary to prevent off-site tracking.

D. Replenish stone as required for the duration of the project.

3.9 STOCKPILE PROTECTION

A. Stockpiles of excavated material, borrow material, or any other material subject to waterborne erosion shall be protected from eroding and provided with means to block discharge of sediment.

B. Small stockpiles of loam, etc. shall be covered with tarps.

C. In general, stockpiles should be broad and gradually sloped, to retard tendency to erode.

D. Establish temporary vegetation on all stockpiles which will not be re-used within three (3) weeks.

E. Provide silt fencing or other perimeter protection to prevent migration of sediment.

3.10 MAINTENANCE

A. Inspect all erosion control devices daily. Immediately repair, adjust, and replace devices if damaged, displaced, or rendered ineffective in any way. When the area is subjected to a rainfall of 1 inch or more within 24 hours, all erosion control facilities shall be inspected and repairs shall be made within 48 hours after the storm. Disposal of materials removed from the control facilities shall be the responsibility of the Contractor as part of site restoration and cleanup.

3.11 REMOVAL AND DISPOSAL

A. At least 70 percent of the disturbed area of the site must be established with erosion resistant cover before interim stabilization measures and temporary erosion and sedimentation control measures may be removed.

B. Do not remove erosion control devices and materials without prior approval of the Architect.

C. Prior to removal of devices, remove all retained silt or other materials and dispose of according to local laws and Division 31.

3.12 WASTE MANAGEMENT – Coordinate with Section 01 74 19

A. Separate and recycle materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

B. Set aside and protect materials suitable for reuse and/or remanufacturing.

C. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

End of Section

SECTION 016100 - MATERIAL AND EQUIPMENT

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. General Standards
B. Products
C. Sustainability
D. Transportation and Handling
E. Storage and Protection

1.3 GENERAL STANDARDS APPLICABLE TO ALL SPECIFICATION SECTIONS

A. These provisions, standards, and tolerances shall apply to all work under this Contract. Where stricter standards and tolerances are specified elsewhere in these Specifications or in references specified in these Specifications, they shall take precedence over these standards and tolerances.

B. Build and install parts of the Work level, plumb, square, and in correct position unless specifically shown or specified otherwise.
   1. No part shall be out of plumb, level, square, or correct position so much as to impair the proper functioning of the part or the Work as judged by the Architect.
   2. No part shall be out of plumb, level, square, or correct position so much as to impair the aesthetic effect of the part or the Work as judged by the Architect.

C. Make joints tight and neat. Provide uniform joints in exposed work. Arrange joints to achieve the best visual effect. Refer choices of questionable visual effect to the Architect.

D. Under potentially damp conditions, provide galvanic insulation between different metals which are not adjacent on the galvanic scale.

E. Manufacturers, subcontractors, and workmen shall be experienced and skillful in performing the work assigned to them; coordinate with Article 5 of Section 00 70 00.

F. All paint used on all products shall conform to ANSI Z66.1, Specifications for Paints and Coatings Accessible to Children to Minimize Dry Film Toxicity.

G. The Drawings do not attempt to show every item of existing work to be demolished and every item of repair required to existing surfaces. Perform work required to remove existing materials which are not to be saved and to restore existing surfaces to condition equivalent to new as judged by Architect. If possible, repairs shall be indistinguishable from adjacent sound surfaces. Where it is impossible to achieve repairs which are indistinguishable from adjacent sound surfaces to

remain, notify Architect, and proceed according to his instructions.

1.4 PRODUCTS

A. Products include material, equipment and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a Specification Section shall be the same, and shall be interchangeable.

D. In the case of an inconsistency between Drawings and the Specifications, or within either document which is not clarified by addendum, the product of greater quality or greater quantity of work shall be provided in accordance with the Designer's interpretation.

E. Provide environmentally preferable products to the greatest extent possible. To the greatest extent possible, provide products and materials that have a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and/or disposal of the product.

1.5 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:

1. Water based.
2. Water-soluble.
3. Can be cleaned up with water.
4. Non-flammable.
5. Biodegradable.
6. Low or preferably no Volatile Organic Compound (VOC) content.
7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
8. Manufactured without compounds that contribute to smog in the lower atmosphere.
9. Do not contain methylene-chloride.
10. Do not contain chlorinated hydrocarbons.
11. Contains the least possible of post-consumer or post-industrial waste.

1.6 TRANSPORTATION AND HANDLING

A. Arrange deliveries of materials in accordance with construction schedules in order to avoid delay in, conflict with, or the impeding of the progress of the Work and conditions at the site.

Deliveries shall be made during regular work hours, unless approved otherwise by the Owner.

B. Deliver materials in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

1.7 STORAGE AND PROTECTION

A. Store materials in accordance with manufacturer's instructions, with seals and

labels accessible for inspection.

Contractor shall be responsible for work and equipment until fully inspected, tested and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material or damaging water.

B. Materials stored on the Site shall be neatly arranged and protected, and shall be stored in an orderly fashion in locations that shall not interfere with the progress of the Work or with the operations of the Owner.

C. Interior Storage: Maintain temperature and humidity within the ranges required by manufacturer's instructions.

D. If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the Work or interfering with the work to be done by any other contractor employed on the Work, or interfering with the Owner's activities, the Contractor shall remove and restack such materials at no additional cost to the Owner.

E. Protection After Installation
   1. Provide adequate coverings to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction.
   2. Remove when no longer needed.

End of Section

SECTION 017329 - CUTTING AND PATCHING

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 01 32 00, and Article 1 of the General Conditions of the Contract (Section 00 70 00).

D. Provide materials, labor, equipment and services necessary and/or required to execute the work of this Section as shown on the drawings, specified herein and/or required by job conditions.

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

A. Definitions
B. Cutting and Patching Requirements
C. Specific Requirements - All Trades

1.3 DEFINITIONS

The following definitions shall apply to all work of this Contract involving cutting, patching, filling and the like.

A. Cutting - those operations required to expose existing construction, or required to permit the installation of work under this contract, or passage of new or relocated work through existing construction.

B. Patching - Those operations required to bring surfaces to a level to permit the application of a finish treatment.

The Contractor responsible for performing the patching shall be responsible for the restoration of the substrate to match adjacent areas, whether new or existing.

C. Replace - Shall mean to furnish and install an entirely new element which matches the original element's material, color, dimension and design.

D. Repair - Shall mean to make the existing element as nearly "new", as possible, by the means and methods indicated for each element.

E. Fill - Shall mean to carefully and thoroughly remove, by approved methods, loose and deteriorated surface material and to install "new" material in the element so that the original contour is completely restored and color matched if exposed as a finished element. Follow manufacturers' instructions as applicable.

F. Match Original - Where indicated, this type of replacement will match the best available representative element, in design, dimension, and installation, with

improvements which represent the best standards of fabrication, so that even if an existing best example of an element is gouged or pitted, or otherwise worn, the new element shall be unworn and without defects and fabricated of new material. The Architect will provide identifications of all original elements.

1.4 CUTTING AND PATCHING REQUIREMENTS

A. Prior to any cutting, drilling or removals, the Contractor shall investigate surface involved.

B. Contractor shall not:
   1. endanger any work by cutting or drilling or otherwise;
   2. cut or drill above the minimum needed to install work.

C. All cutting and patching shall be performed using skilled mechanics of the trade or craft involved.

1.5 SPECIFIC REQUIREMENTS BY CONTRACTS

A. <u>All Prime Contractors</u> are required to provide a complete installation of their work. This will include all provisions of Divisions 1 and 2, the specified trade sections, including for all Contractors as it applies to their work: Selective Demolition, Louvers and Vents, and Access Doors and Frames. In general:
   1. For areas where there is no General Contractor work, each prime shall do all work needed for a complete installation, regardless of trade work needed. For example, where the HC needs to access above a drop ceiling in a hall to install duct work, and no GC work is shown in that hall, the HC will be responsible for removing and restoring the drop ceiling as needed to do their work.
   2. In areas of all new work, Contractors shall work in a normal progression and in accordance with the coordinated schedule and normal construction conventions. General Contractor shall allow reasonable time for other contractors to install work or will be responsible for any removals or cutting and patching needed to perform that work. Trades shall install their work as noted on the schedule. Failure to do so, after 2 notices from the GC, the first at least 5 business days in advance and the second at least 2 business days in advance, will free the GC to proceed with scheduled work. The trade contractor shall be responsible for any cutting and patching, or rerouting needed for a complete installation.
   3. In areas of alteration contractors shall provide a complete installation in sequence with the coordinated schedule. The GC, if they have scope in an area, shall be responsible for all finish work visible in the occupied space. For example, where a duct is removed the Mechanical Contractor will remove and close off the wall. However, if the opening will be visible, the GC is responsible for the finish work. Where the finish is to be exposed masonry, the GC shall be responsible for the masonry work.

B. Exceptions to the above will be only as specifically noted in the documents and drawings and as noted below.
   1. The General Contractor is responsible for:
      a. Temporary provisions except where specifically noted by others, including physical separations, signage, and barriers required

between occupied and unoccupied areas.

b. Site work (storm, water, drainage, sewage) including utilities up to 5' from the building line, and those that do not enter the building. Exceptions shall be electrical lines and systems, gas lines and systems, fuel lines and fuel systems, and work specifically designated to be by another Prime Trade Contractor.

c. All trenching and backfill of utilities both inside and outside the building line, with bedding by the trade contractor requiring same and that trade furnishing the warning tape to be installed by the General Contractor during backfill. Review of all drawings to identify the full scope of work. For example; bollards protecting gas rigs are typically shown on PC drawing.

d. All work related to roofing and roof penetrations shall be the scope of the GC. This is to include all steel dunnage at roof level, and fastening, flashing and sealing of roof related materials to be provided by the trade requiring same. GC to review all trade roof drawings and to assume a minimum of one pitch pocket, or the like, for roof fans and two for larger units. For example: The HC would be required to layout for the roof curb, deliver it to the installation location, and monitor the final placement. The GC/roofer to open the roof, place the curb with blocking, seal the roof, and provide a temporary cover until the HC needs for mechanical equipment.

e. Even in areas where there is no other GC work, the GC is responsible for all exposed masonry work. For example: The HC removes a louver in a exterior brick wall and the opening is to be filled in. The HC is responsible for all the related removal and patching, except the GC will perform the brick work.

f. Even in areas where there is no other GC work, the GC is responsible for all concrete work, including housekeeping pads, trenching, and cutting, removal and patching of existing slabs as required for the work of other Prime Trade Contractors.

g. Any abatement shown, including restoration of areas or items to remain, except where such restoration is called for by another contractor.

h. Waste containers / dumpsters for their work and for non-hazardous waste for all trades.

i. Counters except as noted under Trade Contractor.

2. The Trade Contractors are responsible for:

a. Storm, Water, Drainage, Sewer to at least 5' beyond the building line

b. Even on the site, electrical lines and systems, gas lines and systems, fuel lines and fuel systems, except work specifically designated to be by the General Contractor.

c. Installing their own bedding and providing warning tape where required.

d. Any excess trenching required beyond the GC's work. The provided trenching at the bottom of trench will be up to 6" below the

utility and the greater of 2x the diameter of the utility or the width of the utility plus 6" on each side

e. Providing all access doors needed for their work to be installed by GC.

f. Review of building elevations and details to coordinate the size, shape, color and installation characteristics of all visible exterior louvers. The intent of the architectural drawings shall govern the design of the louvers.

g. Recycling of all materials removed under their contract that may be considered hazardous or otherwise require special handling. This includes gasses, equipment gasses are recovered from, lamps, ballasts, and similar.

h. Louvers, internal connections and operational devices are to be coordinated, provided and installed by Contractor requiring same.

C. Clarifications

1. Below is intended to be a supplement to the following: Section 01 31 13 Project Coordination and Section 01 73 29 Cutting and Patching

a. All contractors are reminded of specific coordination requirements with other trades and failure to coordinate or be aware of other's work shown on another trade's drawings will not be the basis for extra cost. Once approved, contractors shall provide a copy of shop drawings to affected trades.

b. **Example**: EC is to power the mechanical equipment provided by the HC, who is required to submit such equipment and provide layout. An EC who runs the power, without coordinating, verifying the layout and equipment power requirements, would be required, without an extra, to wire to the approved layout configuration.

c. **Example**: GC closes up a new wall without providing EC time to rough or closes up without notice or before roughing time is finished. GC is responsible for all costs related to opening and closing wall for EC to rough.

d. **Example**: EC does not rough promptly or as provided for on schedule. GC provides notice then closes up new wall as shown on schedule. EC is now responsible for all cutting and patching as needed to do their work. (Turn-key Operation)

e. **Question**: In the existing mechanical area, there is no demolition shown but openings are called for in an existing wall for a return air louver. Who does the demolition and who does the finish work? **Answer**: Since the openings are only as required for new work it falls under Cutting and Patching. Regardless, each Prime Contractor is responsible for a complete installation, except where others are specifically assigned work. Therefore, the HC would be required to open the wall for the new louver, install, and restores finishes.

f. **Question**: When do warranties go into effect; especially equipment?

Answer: A complete and accepted system will be understood to mean a system where the Owner has received all required demonstrations, instructions, and operating and maintenance materials. Exceptions may be equipment operating as intended for beneficial use.

Example: HVAC unit is installed in June and starts being used to condition air for beneficial occupancy in July. The Unit is shown to be fully functional, but systems are not balanced, and controls are not coordinated until August 1st. The Owner receives training September 1st. The unit's manufacturer warranty may start in July. However, the contractor's full material and labor warranty, and the controls warranty, will not start until September 1st. The contractor is responsible for monitoring and maintaining the unit, including filters, until turned over on September 1st.

End of Section

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Any and all “Waste Handlers and Haulers” shall be licensed by the Authority having jurisdiction over “Solid Waste Management” and a copy of said license shall be submitted in accordance with Article 1.05 herein.

1.2 DESCRIPTION OF WORK

A. This Section specifies requirements for a complete program for implementation of waste management controls and systems for the duration of the Work and to –

1. Protect the environment, both on-site and off-site, during construction operations.
2. Prevent environmental pollution and damage.
3. Maximize source reduction, reuse and recycling of solid waste.

1.3 INTENT

A. The Owner has established that this Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized to the greatest extent practical. With regard to these goals the Contractor shall develop, for Construction Manager’s and Architect’s review, a Waste Management Plan for this Project. The Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities, as defined by governing laws of the jurisdiction of the Work.

1.4 WASTE MANAGEMENT PLAN

A. After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner, Construction Manager and Architect to discuss the proposed Waste Management Plan and to develop mutual understanding relative to details of environmental protection.

B. Waste Management Plan: The Contractor shall provide a plan containing the following:

1. Analysis of the proposed jobsite waste to be generated, including types and rough quantities.
2. Landfill Options: The name of the landfills where trash and building debris will be disposed of, the applicable landfill tipping fees, and the projected cost of disposing of all Project waste in the landfills.
3. Landfill Certification: Contractor's statement of verification that landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive waste from this project.
4. Alternatives to Landfilling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:
    a. Cardboard.
    b. Clean dimensional wood.
    c. Beverage containers.
    d. Land clearing debris.
    e. Concrete.
    f. Bricks and masonry.
    g. Asphalt.
    h. Gypsum boards.
    i. Acoustical ceiling material (grid separate).
    j. Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
    k. Glass, colored glass allowed.
    l. Plastic.
        1. Type 1: Polyethylene Terephthalate (PET, PETE).
        2. Type 2: High Density Polyethylene (HDPE).
        3. Type 3: Vinyl (Polyvinyl Chloride or PVC).
        4. Type 4: Low Density Polyethylene (LDPE).
        5. Type 5: Polypropylene (PP).
        6. Type 6: Polystyrene (PS).
        7. Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.
    m. Paint and paint cans.
    n. Carpet.
    o. Insulation.
    p. Light Fixtures and other electrical apparatus.
    q. Others as appropriate.
5. Meetings: A description of the regular meetings to be held to address waste management.
6. Materials Handling Procedures: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

7. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

1.5 SUBMITTALS

A. Construction Waste Management Plan: Submit 3 copies of plan within 21 days of date established for the Notice to Proceed.

B. Calculations and supporting documentation to demonstrate end-of-project recycling rates meeting the requirements for Construction Waste Management Plan of Item above.

C. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Architect's review and approval.

D. Waste Reduction Progress Reports: Concurrent with the Applications for Payment, submit three copies of report. Include monthly tabulations for demolition and construction waste sent off-site for disposal or recycling.

E. Waste haulers solid waste management license.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 RECYCLING

A. Metal, including but not limited to aluminum stairs, structural beams and sections, and reinforcing steel shall be recycled.

B. Wood that is not painted and does not contain preservatives (i.e. creosote, arsenic, and chromium-containing preservatives) shall be segregated and recycled.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION – All sorting will be done “off site” by a recognized construction and demolition processing facility who will be responsible for provision of all documentation as to where loads were processed and the recycling rate achieved.

**End of Section **

SECTION 017700 - PROJECT CLOSE OUT

PART 1 - GENERAL

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 013200, and Article 1 of the General Conditions of the Contract (Section 007000).

1.2 REQUIREMENTS INCLUDED

A. Final Cleanup
B. Required Close Out Documentation
C. Orientation Instruction
D. Project Close Out Inspections
E. Bake Out Procedures

1.3 FINAL CLEANUP

A. The Contractor shall leave the work ready for use and occupancy without the need of further cleaning of any kind.

B. The Contractor shall remove all tools, appliances, project signs, material and equipment from the phased areas as soon as possible upon completion of the work.

C. The work is to be turned over to the Owner in new condition, in proper repair and in perfect adjustment.

1.4 REQUIRED CLOSE OUT DOCUMENTATION

A. Prior to final payment the Owner shall receive, in addition to those documents required by the General Conditions, the following:
   1. Project record documents as per Section 017719.
   2. The Contractor's general guarantees.
   3. Specific guarantees of material, equipment and systems installed in the work.
   4. A copy of all test data taken in connection with the work.
   5. One (1) copy of all operation and maintenance manuals which shall include:
      a. Parts List, including illustrations, assembly drawings and diagrams required for maintenance, predicted life of parts subject to wear, and recommendations for stocking spare parts.
      b. Copies of accepted shop drawings, charts and diagrams.

c. Names, addresses and telephone numbers of manufacturer's representative and service company.

d. Letters from each manufacturer certifying that his equipment was properly installed and is operating in accordance with manufacturer's intent.

6. All keys, tools, screens, spare construction material and equipment required to be furnished to the Owner as part of the work.
7. Copies of all Certification of Specifications Compliance as per Section 01 33 00.
8. Final survey if required by Municipality AND/OR Owner.
9. Record of Material Safety Data Sheets (MSDS).
10. Certified Payroll Records.

1.5 ORIENTATION INSTRUCTION

A. Prior to final payment appropriate maintenance personnel of the Owner shall be oriented and instructed by the Contractor in the operation of all systems and equipment as required by the Contract.

1.6 PROJECT CLOSE OUT INSPECTIONS

A. When the Work has reached such a point of completion that the building or buildings, equipment, apparatus or phase of construction or any part thereof required by the Owner for occupancy or use can be so occupied and used for the purpose intended, the Contractor, prior to notification to the Architect, shall make a preliminary inspection of the Work to insure that all the requirements of the Contract have been met and the Work is substantially complete and is acceptable.

B. Upon such notification, the Owner or the Architect and the Construction manager shall make a detailed inspection of the Work to insure that all the requirements of the Contract have been met and that the Work is complete and is acceptable.

C. A copy of the report of the inspection shall be furnished to the Contractor as the inspection progresses so that the Contractor may proceed without delay with any part of the Work found to be incomplete or defective.

D. When the items appearing on the report of inspection have been completed or corrected, the Contractor shall so advise the Construction Manager and the Architect. After receipt of this notification, the Construction Manager or the Architect shall inform the Contractor of the date and time of final inspection.

E. A copy of the report of the final inspection containing all remaining contract exceptions, omissions and incompletions shall be furnished to the Contractor.

F. After the receipt of notification of completion and all remaining contract exceptions, omissions and incompletions from the Contractor, the Owner and Architect and the Construction Manager will reinspect the Work to verify completion of the exception items appearing on the report of final inspection.

G. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance or will furnish to the Contractor a copy of the report of the Architect's reinspection detailing Work that is incomplete or obligations that have not been fulfilled but are required for final acceptance.

H. The Contractor shall pay the Architect and Construction Manager for services performed in inspection beyond the original inspection and one reinspection of the

same area, through a "credit" change order to the Owner in accordance with Schedule outlined in Section 01 25 00.

1.7 BAKE OUT PROCEDURES HVAC CONTRACT - Coordinate with Section 01 15 01

A. Heat all areas of new construction to 95 degrees for a minimum of 72 hours.

B. At the end of this period ventilate area with 100 percent outside air and exhaust air for a minimum of 24 hours to eliminate off gassing that occurs during bake out period.

C. Change all air filters upon completion.

End of Section

SECTION 017719 - PROJECT RECORD DOCUMENTS (Coordinate with the General Conditions)

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 007000) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 013200, and Article 1 of the General Conditions of the Contract (Section 007000).

1.2 REQUIREMENTS INCLUDED

A. Project Record Drawings

B. Record Drawing Certification

1.3 PROJECT RECORD DRAWINGS

A. The purpose of the project drawings is to record the actual location of the work in place including but not limited to underground lines, concealed piping within buildings, concealed valves and control equipment, and to record changes in the work.

In addition to the above, these drawings shall be "color-coded", by each trade, on a daily basis to indicate progress of the work. Color legend will be assigned by the Architect.

B. In addition to the sets of contract drawings that are required by the Contractor on the site to perform the work, the Contractor shall maintain, at the site, one (1) copy of all drawings, specifications and addenda that are part of the Contract as awarded.

Each of these documents should be clearly marked "Project Record Copy", maintained in a clean and neat condition available at all times for inspection by the Owner, Construction Manager or the Architect, and shall not be used for any other purpose during the progress of the work.

The Construction Manager will be the custodian of the project record documents until the end of the Project.

C. Project Record Requirements

1. The Contractor shall mark-up the "Project Record Copy" to show:
   a. Approved changes in the work.
   b. Location of underground work and concealed work.
   c. Details not shown in the original Contract Documents.
   d. Any relocation of work including piping, conduits, ducts and the like.

e. All changes in dimensions.
f. All access doors and "tack" locations access points in accessible ceilings.
g. Location of all plumbing, heating, ventilating, air conditioning or electrical assemblies, whether existing to remain or newly installed.
h. Revisions to any electrical circuitry.

2. Such information shall include, but shall not be limited to:
a. Footing depth in relation to finished grade elevations.
b. Any change in floor elevations.
c. Any structural changes.
d. Any substitutions.
e. Elevations and locations of all underground utilities, services, or structures referenced to permanent above ground structures or monuments.
f. Designation of all utilities as to the size and use of such utilities.
g. All invert elevations of manholes.
h. The location of all utilities, services and appurtenances concealed in building structures that have been installed differently from that required by the Contract.
i. Any approved change order.

and other such data as required by the Architect and/or Owner so as to establish a complete record of "As-Constructed" conditions.

D. The Contractor shall keep the project record documents up-to-date from day to day as the work progresses. Appropriate documents are to be updated promptly and accurately; no work is to be permanently concealed until all required information has been recorded.

E. The project record drawings are to be submitted by the Contractor to the Architect through the Construction Manager when all the work is completed and is approved by the Owner and the Architect before the Contractor may request final payment.

If the project record drawings as submitted are found to be unacceptable due to incompleteness or inaccurate information, the drawings shall be returned to the offending Contractor for corrective action and resubmitted for approval prior to the release of final payment.

FINAL PAYMENT IS CONTINGENT UPON PREPARATION OF FINAL PROJECT RECORD DRAWINGS ON A SET OF "PRINTS" and CAD DISKETTES IN "DXF" or “DWG” FORMAT AS APPROVED BY THE OWNER (A SET OF BASE DISKETTES WILL BE FURNISHED BY THE ARCHITECT) AND SUBMITTAL OF SAME TO THE OWNER, THROUGH THE ARCHITECT.

F. In addition to the drawings required as mentioned above, the Contractor shall submit a list of all approved Shop Drawings of the Work as installed.

From this list the Architect will select the drawings desired for permanent records. The Contractor shall furnish these in a bound set to the Owner as part of the

closeout requirements.

1.4 RECORD DRAWING CERTIFICATION

A. The record drawings required under the terms and conditions of this Section shall be reviewed and processed by each of the Prime Contractors as part of their overall contractual responsibility.

B. This certification may be issued for individual trades or as a collective document to cover the entire record drawing requirements of the project.

The format of this certification shall be as follows:

These record drawings prepared by:

_____

for _____ 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 to the requirements of the contract documents.

Firm Name: _____

Review Date:_____By:_____

End of Section

SECTION 017823 - OPERATION AND MAINTENANCE REQUIREMENTS

1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the General Conditions of the Contract (Section 00 70 00) and the balance of Division #1 and the Technical Specifications.

B. All Contractors, Subcontractors, Sub-subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

C. Definitions as apply to "Contractors" involved with the work of this Project shall be as set forth in Article 1.01 of Section 013200, and Article 1 of the General Conditions of the Contract (Section 007000).

1.2 REQUIREMENTS INCLUDED

A. Start Up and Demonstration

B. Parts List

C. Operation and Maintenance Data

1.3 START UP AND DEMONSTRATION

A. The work required herein consists of starting up and demonstrating all systems and equipment to operating personnel and includes training of said operating personnel.

B. The respective Trade or Subcontractor shall make arrangements, via the Construction Manager and/or the Owner (with notification to the Architect), as to whom the instructions are to be given in the operation of the basic and auxiliary systems and the period of time in which they are to be given.

C. As specified in individual sections, furnish the services of instructors to train designated personnel in adjustment, operation, maintenance, and safety requirements of equipment and systems. If procedures are not specified for specific items of equipment, follow that recommended by the item Manufacturer.

D. Instructors shall be thoroughly familiar with the equipment and systems and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given after the equipment or system has been accepted and turned over to the Owner. The duration of instruction shall be as specified in individual sections but shall be not less than two (2) days on each portion of operating mechanical/electrical systems. Use Operating and Maintenance Data as a training guide.

E. The Architect shall be completely satisfied that the representative of the Owner has been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Architect determines that complete and thorough instructions have not been given by the contractor to the Owners' Representative, then the offending Contractor shall be directed by the Architect to provide whatever instructions are necessary until the intent of this paragraph of the Specification has been complied with as determined by the Architect.

1.4 PARTS LIST

A. As required the respective Trade or Subcontractor shall furnish one (1) typed set of instructions for the ordering and stocking of spare parts for all equipment installed. The lists shall include parts numbered and suggested supplier. Each set shall also include an itemized list of component parts that should be kept on hand and where such parts can be purchased.

1.5 OPERATION AND MAINTENANCE DATA

A. The Contractor shall submit to the Architect for approval one (1) typed set, bound neatly in hard backed loose leaf binders, of all instructions for the installation, operation, care and maintenance of all equipment, fixtures and systems.

1. Provide typed or printed label identifying binder as operating and maintenance data. List title of project, contract number, and location of equipment.
2. Furnish manufacturer's printed data or sheets neatly typewritten on 8-1/2 inch by 11 inch, 20 pound minimum white paper. Provide indexed tabs.
3. Drawings: Bind in with text. Provide reinforcement rings. Fold larger drawings to the size of the text pages.

Information shall indicate possible problems with equipment and suggested corrective action.

B. CONTENT OF MANUAL FOR EQUIPMENT AND SYSTEMS

The instructions shall contain information deemed necessary by the Architect and include but not be limited to the following:

1. Introduction:
   a. Explanation of Manual and its use.
   b. Summary description of all mechanical and electrical and equipment operating systems.
   c. Purpose of systems.
   d. Maintenance scheduling summary analysis, sheets and software operating instructions and diskette(s).
2. System:
   a. Detailed description of all systems.
   b. Illustrations, schematics, block diagrams, photographs and other exhibits.
   c. Complete wiring diagrams, tabulations and installation drawings.
   d. Valve tag charts and control diagrams.
   e. 1/2 size reduced copy of "Record Drawings".
3. Operations:
   a. Complete detailed, step-by-step, sequential description of all phases of operation for portion of the systems, including startup, shutdown, adjusting and balancing, and emergency procedures. Include all posted instruction charts.
4. Maintenance:
   a. Parts list and parts number.
   b. Maintenance, lubrication and replacement charts and Contractor's

recommendations for preventative maintenance.

c. Trouble shooting charts for systems and components.
d. Instructions of testing each type of part.
e. Recommended list of on-hand spare parts.
f. Complete calibration instructions for all parts and entire systems.
g. Instruction for charging, filling, draining and purging.
h. General or miscellaneous maintenance notes.

5. Manufacturer's Literature:
   a. Complete listing for all parts with names, addresses and telephone numbers.
   b. Care and operation.
   c. All and only pertinent brochures, illustrations, drawings, cuts, bulletins, technical data, certified performance charts and other literature with the model actually furnished to be clearly and conspicuously identified.
   d. Internal wiring diagrams and engineering data sheets for all items and/or equipment to be furnished.
   e. Guarantee and warranty data.
6. Instructions for lubricating each piece of equipment installed. Instructions shall state type of lubricant, where and how frequently lubrication is required.

Frame all instructions under glass and hang in the Mechanical Room or other location as directed by Architect.

C. MANUALS FOR PRODUCTS, MATERIALS, AND FINISHES:
1. Submit one (1) copy of complete manual in three ring binder.
2. Submit one (1) USB drive of complete manual.
3. Content: Provide complete information for architectural products, applied materials, and finishes.
   a. Manufacturer's data, including catalog number, size, composition, color and texture designations, and information for reordering.
   b. Instructions for care and maintenance, including manufacturer's recommendations for cleaning agents and methods; cautions against detrimental cleaning agents and methods; and recommended schedule for cleaning and maintenance.

End of Section

SECTION 024119 – SELECTIVE REMOVALS AND DEMOLITION

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all selective removal and demolition work as indicated by reference notes on drawings without limitation and as required for this project including proper protection of existing plant functions and facilities from damage and dirt during construction operations, including the following:

1. Provide all temporary shoring systems as necessary in conjunction with the removal and new opening operations.
2. Openings in existing masonry exterior walls. Coordinate with Division 9 and for patching, filling, and finishing of newly created openings. Exposed existing cut surfaces shall be patched and ground smooth to align with existing and finished to match adjacent surfaces
3. Perform cutting and chasing operations in connection with electrical work where indicated so as to permit recessed mounting of conduits and boxes. Coordinate with "Electrical" for extent of chasing. Coordinate with "Plaster" for "peel-back" effect for inconspicuous patching.
4. Perform balance of all demolition and removal work as required by the drawings and existing conditions, including performing of all necessary cutting, removals, and the like for the proper installation of all new work.
5. Properly protect existing plant functions and facilities from damage and dirt during construction operations.
6. Perform demolition of abandoned piping, wiring, or equipment items when safely disconnected from operating services.

NOTES:

1. Cutting and patching requirements shall be as defined in Sections 01 31 13 and 01 73 29 and coordinated herein. Coordinate with Trade Contractors.
2. In the event contaminated earth or asbestos-contaminated materials are encountered during the demolition work of any Prime Contractor, said Contractor shall immediately notify the Architect in writing for instructions as to procedures to be taken. Demolition and removals shall be done in such a manner to permit the Owners' consultant and asbestos abatement contractor access to the areas as required to look for, identify and abate asbestos conditions before damaging possible asbestos. All Contractors shall cooperate with the Owners' separate contractors to expedite abatement. The Owner will arrange for timely inspection, testing and abatement if necessary.

B. The Contractor shall:

1. Take photographs of existing conditions of structure surfaces, equipment and adjacent improvements that may be misconstrued as damage related to

removal operations. These photographs shall be submitted to the Architeect prior to start of any work.

2. Provide temporary barricades and other forms of protection required to protect occupants of the building and general public from injury due to selective removals and demolition work.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification with specific reference to Sections noted above.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies
OSHA Code requirements governing removal and demolition Work.
1. Comply with applicable requirements of American National Standards Institute (ANSI) Standard A10.6-1969, Safety Requirements for Demolition.

B. Do all demolition work only at such times and in such a manner as is approved by the Owner and is in compliance with above referenced codes, documents, procedures, plans or instructions. Noise shall be held to a minimum when working in or around functioning areas.

1.5 SUBMITTALS

A. Submit a schedule indicating proposed methods and sequence of operations for selective removals and demolition Work prior to commencement of operations. Include details for dust and noise control operation. Provide a detailed sequence of removals and demolition work to ensure uninterrupted progress of school sessions.

B. Material Safety Data Sheet (MSDS) must be submitted for each product.

C. Schedule of items and materials to be salvaged. Identify procedures for disassembly.
1. Coordinate with Solid Waste Management Plan. Identify materials to be recycled. Identify materials to be salvaged for reuse on site and off site.

1.6 REQUIREMENTS AND RESTRICTIONS

A. Do all removal work only at such times and in such a manner as is approved by the Owner and is in compliance with above referenced codes, documents, procedures, plans or instructions. Noise shall be held to a minimum when working in or around functioning areas.

B. The work of this section shall be accomplished by a Contractor experienced in removal and alteration work on projects of similar size and complexity within the past 5 years. Evidence of such experience on 5 such projects shall be submitted to the Owner for his evaluation.

C. Provide temporary barricades and other forms of protection required to protect Board of Education property, personnel, students, occupants of the building and general public from injury due to selective removals and demolition work.
1. Protect from damage existing finish work that is to remain in place and which becomes exposed during operations.
2. Protect floors with building paper or other suitable covering.
3. Strict dust control measures shall be implemented and maintained at all times.

D. Maintaining Traffic
   1. Ensure minimum interference with roads, streets, parking lots, driveways, sidewalks, paths and adjacent facilities.
   2. Do not close or obstruct streets, driveways, lots, paths, sidewalks, passages and the like without permission of the Owner.
   3. When required by Owner or governing authorities, provide alternate routes around closed or obstructed traffic ways.

E. Notify all corporations, companies, individuals or local authorities owning, or having jurisdiction over, utilities running to, through or across areas disturbed by demolition operations. The Contractor shall notify the following prior to beginning operations:
   1. Digsafe
   2. All utility companies whose services are within 10 feet of the work of this Contract.

F. Keep public ways clear of all spillage from trucks hauling material to and from the project site.

G. Strict dust control measures shall be implemented and maintained at all times. Thoroughly wet down all work being demolished and all trucking ways as necessary to prevent spreading dust.

H. Damages - Promptly repair any and all damages to all property and finishes caused by the removals and demolition work; to the Owner's satisfaction and at no extra cost to the Owner.

1.7 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
   1. Water based
   2. Water-soluble
   3. Can be cleaned up with water
   4. Non-flammable
   5. Biodegradable
   6. Low or preferably no Volatile Organic Compound (VOC) content
   7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere
   8. Manufactured without compounds that contribute to smog in the lower atmosphere
   9. Do not contain methylene-chloride
   10. Do not contain chlorinated hydrocarbons
   11. Contains the least possible of post-consumer or post-industrial waste

PART 2 - PRODUCTS

2.1 MATERIALS

A. Protective Devices and Materials shall be the Contractor's option, subject to approval of the Architect and in compliance with the reference standard.

B. Power driven Tools - only hand held electric power driven tools conforming to the following criteria shall be used to cut or drill concrete and masonry:
   1. Electric Chiseling Hammer

a. Power Data 115 Volts AC; 7-8 Amps; Three wire grounded connection
b. Percussion 2400-2600 Impacts per Minute
c. Type/Size Hand held (+ 18 inch length)
d. Unit Weight 12-15 pounds (minus chisel bit)

2. Electric Hammer Drill
   a. Power Data 115 Volts AC; 5-8 Amps; Three wire grounded connection
   b. Percussion 2400-3200 Impacts per Minute
   c. Type/Size Hand held (+ 18 inch length)
   d. Unit Weight 12-15 pounds (minus chisel bit)
   e. Speed Data 0-0500 RPM (Under load)
3. Electric Core Drill
   a. Power Data 115 Volts AC; 7-8 Amps; Three wire grounded connection
   b. Floor or wall anchored unit.
   c. Speed Data 0-1500 RPM (Under load)

Any other hand operated electric tools used for cutting, sawing or other operations shall be submitted to the Owner's Representative for approval prior to use for execution of the Work.

PART 3 - EXECUTION

3.1 INSPECTION

A. Prior to commencement of the selective removals and demolition Work, inspect the areas in which the Work will be performed. Determine and list the existing conditions of rooms or area surfaces and equipment. After the Work in each respective area is completed, determine if adjacent surfaces or equipment have been damaged as a result of the Work; if so, the damage shall be corrected at the Contractor's expense.

3.2 REMOVALS AND DEMOLITION WORK

A. Perform selective demolition Work in a systematic manner and use such methods as required to complete the Work indicated on the Drawings in accordance with the requirements of the Project Specifications and governing City, State, and Federal regulations.
B. Do no demolition or remove any items until it is certain that a condition will not be created which might jeopardize the weathertightness or structural adequacy of the existing building.
C. Demolish masonry walls and structural elements in small sections.
D. Do not throw rubbish or old materials of any kind from the upper stories to any point outside the building.
E. Proceed with the work of demolition and removal in an orderly manner and without noise or other disturbance to the operations of the existing facility.

3.3 DISPOSAL OF DEMOLISHED MATERIALS – Coordinate with Section 01 74 19 for Waste Management Plan Implementation.

A. Remove debris, rubbish and other materials resulting from the removals and

demolitions from the building immediately; transport and legally dispose of materials off the project site. Disposal method shall be in accordance with City, State, and Federal regulations.

B. Burning of removed materials is not permitted on the job site or any area of the Owner's property.

33.4 CLEANUP AND REPAIR

A. Upon completion of removals and demolition Work, remove tools, equipment and all remaining demolished materials from the site.

B. Repair all damaged areas caused by the removals and demolition Work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

C. All areas in which Work was performed under this Section shall be left "broom-clean."

End of Section

OMEGA ENVIRONMENTAL SERVICES, INC

ASBESTOS BULK SAMPLING & ANALYSIS REPORT

[Omega Project #22-1181]

CLIENT NAME/ADDRESS:	Sarah Dirsa Kaeyer, Garment & Davidson Architects, PC 285 Main Street Mt. Kisco, NY 10549
SITE/BUILDING:	Nyack Middle School 98 South Highland Avenue Nyack, NY 10960 Upper Nyack Elementary School 336 N Broadway Nyack, NY 10960 Liberty Elementary School 142 Lake Road Valley Cottage, NY 10989 Valley Cottage Elementary School 26 Lake Road Valley Cottage, NY 10989
LEVEL/ROOM/AREA:	Locations Specified on Drawings (Accessible SOW Materials Only)
SURVEY DATE:	6/18/2022 **(Second Visit Needed for Roof Testing)**
REPORT DATE:	8/26/2022
PURPOSE OF ASBESTOS BULK SAMPLING:	Pre-Renovation Visual Screen
SURVEY SCOPE:	Full Access (y/n) Yes Accessible Materials Only (y/n) Yes Probe Cuts (y/n) No Concealed Materials (y/n) Yes Drawing Provided (y/n) Yes PW-1 (NYC only) No
INSPECTOR/INVESTIGATOR:	Name: Gboyega Adewuyi and Eddy Montoya Signature: _____ License #: 148488/11-10373 & 13-12147/153271
PROJECT MANAGER:	Name/Signature: Anton Rezin/_____
REPORT QC BY:	Name: Veronica Kero, CIH, P.E.
SUMMARY OF FINDINGS:	**Asbestos Delineated (y/n)** **Yes**

Ω *Omega Environmental Services, Inc. 280 Huyler Street • So. Hackensack, NJ 07606 • Tel: (201) 489-8700 • Fax: (201) 342-5412*

SAMPLING LIMITATIONS/CONDITIONS:

It is important to note that all asbestos containing materials (ACM) may not be delineated during one single sampling event. Frequently, as a project progresses and wall/ceilings, equipment, and other concealed areas are exposed, additional bulk sampling may potentially be required.

The following limitations/exclusions apply:

1. Asbestos bulk sampling report should not be used as sole reference source to determine Contractor scope of work – additional field coordination required in order to generate "Abatement Work Plan".
2. If scope of renovation changes, and/or walls/ceilings/chases/flooring opened, then additional asbestos bulk sampling required at a later date.
3. Until selective demolition is performed, all concealed materials cannot be viewed or accessed for sampling.
4. All sampling is representative in nature and does not reflect every square inch of material.
5. Roof/façade sampling: Roof leaks may occur as a result of roof bulk sampling. Omega will utilize temporary roof patch; however, since Omega is not a professional roofer, we cannot make guarantees or maintain warrantees against roof leakage.
6. Findings are representative of site conditions on day of investigation.
7. Subject survey conducted according to published regulations in effect on survey date.

Building/Area Description:

The subject building would be described as an educational facility.

The bulk sampling was performed in the locations specified on drawings.

Asbestos Sample Analysis Methods and Sample Count:

- *PLM by EPA 600/M4/82/080* and *NYS 198.1*(friable): # samples collected 77
- *TEM-NOB by NYS ELAP 198.4* (non-friable): # samples collected 18
- *PLM-NOB by NYS ELAP 198.6* (non-friable): # samples collected 18

Bulk samples were submitted to ELAP accredited Laboratory Testing Services / accreditation #10955 utilizing sealed chain-of-custody procedures.

Definitions:
ACM: asbestos containing material
RACM: regulated asbestos containing material
VCM: vermiculite containing material
TSI: thermal system insulation (pipe insulation)
SSI: surfacing material (spray-on fireproofing, plaster, etc.)
Miscellaneous finish material: sheetrock, floor tile, roofing, other
NOB: non-organically bound non-friable material (e.g. roofing, floor tile, etc.)
Significantly damaged: 20% or more of asbestos surfacing material has visible damage.
Damaged: less than 20% or asbestos surfacing material has visible damage or damage is scattered such that less than 20% of total surface area impacted.
No visible damage: no visible damage noted.

Criteria for Positive Classification as Regulated Asbestos Containing Material (RACM):

Asbestos containing material (ACM)

The EPA defines ACM as any material having an Asbestos content greater than 1%. If the analytical results for any sample of suspected material indicate that asbestos is present above a level of one percent, the building material is classified as regulated ACM (RACM) which triggers management and/or abatement, if impacted.

Vermiculite

NYSDOH requires additional second tier analysis of spray-on fireproofing and other surfacing materials found to contain 1% or greater vermiculite during standard PLM bulk sample analysis. The purpose of the NYS ELAP 198.8 method is to reduce background interference in order to verify asbestos content down to 1%.

Representative Nature of All Sampling:

The purpose of bulk sampling is to characterize representative materials, not remove and test every square inch of material. The Inspector/Investigator uses a combination of EPA recommended bulk sampling criteria and professional judgment to select representative sampling locations of each suspect material type. In certain rare cases, building materials may appear to be homogeneous (e.g. plaster, roofing, etc.) but vary section to section due to patching, different installation methods floor-to-floor, and other causes. Additional testing beyond normal survey protocol can be required for these scenarios.

Asbestos Survey Methodology:

HOMOGENEOUS AREAS: A homogeneous area is a portion of a building/structure with similar/same installed materials such that bulk analysis results from one area can be applied in the next for the purpose of asbestos quantification.

'FIRST POSITIVE STOP': In order to reduce unnecessary survey laboratory analysis costs when samples are collected in groups of three (3) or two (2), as required by EPA sampling criteria, when the first or second sample is reported as positive in a group, then the additional samples are declared positive with no analysis.

SAMPLING FROM SLAB UP: Because older/original bottom layer materials are more likely to contain asbestos versus newer layers, materials such as floor tiles and roofing are sampled from the slab up. If a positive lower or middle layer is identified, all materials in the layered system can be declared ACM if they cannot be separated during the abatement process.

SHEETROCK JOINT COMPOUND TESTING: Since most sheetrock wallboard systems are painted, it is difficult to impossible to assess where one type of material starts and ends. EPA has published memos concerning composite sampling that were not approved by OSHA which requires discrete sampling. This agency does not recognize composite testing of joint compound for the purpose of preventing employee exposure. NYSDOL also requires separate sampling of joint compound. The PLM analysis method has been generally utilized for this material type, where samples in the trace-1% inconclusive range are also run by TEM-NOB for additional accuracy.

Ω *Omega Environmental Services, Inc. 280 Huyler Street • So. Hackensack, NJ 07606 • Tel: (201) 489-8700 • Fax: (201) 342-5412*

Asbestos Bulk Sampling & Analysis Results:

Representative bulk sampling and analysis was conducted on 6/18/2022 by Gboyega Adewuyi and Eddy Montoya according to the following:

SAMPLE ID	HA	SAMPLE LOCATION	MATERIAL DESCRIPTION	EST. # OF LAYERS	FRIABLE/ NON-FRIABLE	LAB RESULTS	
						%Asbestos	%Vermiculite
Upper Nyack Elementary School							
1	1	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
2	1	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
3	2	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
4	2	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
5	2	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
6	3	1st Floor – Library	Drywall	1	Friable	None Detected	None Detected
7	3	1st Floor – Library	Drywall	1	Friable	None Detected	None Detected
8	4	1st Floor – Library	Joint Compound	1	Friable	None Detected	None Detected
9	4	1st Floor – Library	Joint Compound	1	Friable	None Detected	None Detected
10	4	1st Floor – Library	Joint Compound	1	Friable	None Detected	None Detected
11	5	1st Floor – Library	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
12	5	1st Floor – Library	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
13	5	1st Floor – Cafeteria	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
14	6	1st Floor – Cafeteria	2x4 Pinhole – Ceiling Tile	1	Non-Friable	None Detected	None Detected
15	6	1st Floor – Cafeteria	2x4 Pinhole – Ceiling Tile	1	Non-Friable	None Detected	None Detected
16	7	1st Floor – Library	2x2 Ceiling Tile – Soft	1	Non-Friable	None Detected	None Detected
17	7	1st Floor – Library	2x2 Ceiling Tile – Soft	1	Non-Friable	None Detected	None Detected
18	8	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
19	8	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
20	9	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
21	9	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected

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SAMPLE ID	HA	SAMPLE LOCATION	MATERIAL DESCRIPTION	EST. # OF LAYERS	FRIABLE/ NON-FRIABLE	LAB RESULTS	
						%Asbestos	%Vermiculite
22	9	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
23	10	1st Floor – Exterior by Library	Red Brick	1	Friable	None Detected	None Detected
24	10	1st Floor – Exterior by Library	Red Brick	1	Friable	None Detected	None Detected
25	11	1st Floor – Exterior by Library	Red Brick – Mortar	1	Friable	None Detected	None Detected
26	11	1st Floor – Exterior by Library	Red Brick – Mortar	1	Friable	None Detected	None Detected
27	11	1st Floor – Exterior by Library	Red Brick – Mortar	1	Friable	None Detected	None Detected
Valley Cottage Elementary School							
28	12	1st Floor – Cafeteria	Fire Stop Caulk – Red	1	Non-Friable	None Detected	None Detected
29	12	1st Floor – Cafeteria	Fire Stop Caulk – Red	1	Non-Friable	None Detected	None Detected
30	13	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
31	13	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
32	14	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
33	14	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
34	14	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
35	15	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
36	15	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
37	16	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
38	16	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
39	16	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
40	17	1st Floor – Library	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
41	17	1st Floor – Library	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
42	17	1st Floor – Library	Fiberglass Pipe Insulation Wrap	1	Friable	None Detected	None Detected
43	18	1st Floor – Library	2x2 Soft Ceiling Tile	1	Non-Friable	None Detected	None Detected
44	18	1st Floor – Library	2x2 Soft Ceiling Tile	1	Non-Friable	None Detected	None Detected
45	19	1st Floor – Exterior	Red Brick	1	Friable	None Detected	None Detected

SAMPLE ID	HA	SAMPLE LOCATION	MATERIAL DESCRIPTION	EST. # OF LAYERS	FRIABLE/ NON-FRIABLE	LAB RESULTS	
						%Asbestos	%Vermiculite
46	19	1st Floor – Exterior Facade	Red Brick	1	Friable	None Detected	None Detected
47	20	1st Floor – Exterior Facade	Red Brick – Mortar	1	Friable	None Detected	None Detected
48	20	1st Floor – Exterior Facade	Red Brick – Mortar	1	Friable	None Detected	None Detected
49	20	1st Floor – Exterior Facade	Red Brick – Mortar	1	Friable	None Detected	None Detected
Liberty Elementary School							
50	21	1st Floor – Cafeteria	Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
51	21	1st Floor – Cafeteria	Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
52	21	1st Floor – Library	Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
53	22	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
54	22	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
55	23	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
56	23	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
57	23	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
58	24	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
59	24	1st Floor – Library	Cube CMU	1	Friable	None Detected	None Detected
60	25	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
61	25	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
62	25	1st Floor – Library	Cube CMU – Mortar	1	Friable	None Detected	None Detected
63	26	1st Floor – Cafeteria Storage Room	Fittings	1	Friable	1.7% Chrysotile	N/A
64	26	1st Floor – Cafeteria Storage Room	Fittings	1	Friable	Positive Stop	-
65	26	1st Floor – Cafeteria Storage Room	Fittings	1	Friable	Positive Stop	-
66	27	1st Floor – Cafeteria	2x4 Fissured Ceiling Tile	1	Non-Friable	None Detected	None Detected
67	27	1st Floor – Cafeteria	2x4 Fissured Ceiling Tile	1	Non-Friable	None Detected	None Detected
68	28	1st Floor – Library	2x2 Soft Ceiling Tile	1	Non-Friable	None Detected	None Detected
69	28	1st Floor – Library	2x2 Soft Ceiling Tile	1	Non-Friable	None Detected	None Detected

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SAMPLE ID	HA	SAMPLE LOCATION	MATERIAL DESCRIPTION	EST. # OF LAYERS	FRIABLE/ NON-FRIABLE	LAB RESULTS	
						%Asbestos	%Vermiculite
Nyack Middle School							
70	29	1st Floor – Cafeteria	Spray-on Fireproofing – Fluffy	1	Friable	None Detected	None Detected
71	29	1st Floor – Cafeteria	Spray-on Fireproofing – Fluffy	1	Friable	None Detected	None Detected
72	29	1st Floor – Cafeteria	Spray-on Fireproofing – Fluffy	1	Friable	None Detected	None Detected
73	30	1st Floor – Cafeteria	Fire Stop Caulk – Red	1	Non-Friable	None Detected	None Detected
74	30	Basement – Electrical Room	Fire Stop Caulk – Red	1	Non-Friable	None Detected	None Detected
75	31	Basement – Electrical Room	Old Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
76	31	Basement – Electrical Room	Old Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
77	31	Basement – Electrical Room	Old Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
78	32	Basement – Electrical Room	Fiberglass Duct Insulation – Wrap	1	Friable	None Detected	None Detected
79	32	Basement – Electrical Room	Fiberglass Duct Insulation – Wrap	1	Friable	None Detected	None Detected
80	32	Basement – Electrical Room	Fiberglass Duct Insulation – Wrap	1	Friable	None Detected	None Detected
81	33	1st Floor – Cafeteria	New Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
82	33	1st Floor – Cafeteria	New Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
83	33	1st Floor – Cafeteria	New Fiberglass Pipe Insulation – Wrap	1	Friable	None Detected	None Detected
84	34	Basement – Electrical Room	1x2 Ceiling Tile	1	Non-Friable	None Detected	None Detected
85	34	Basement – Electrical Room	1x2 Ceiling Tile	1	Non-Friable	None Detected	None Detected
86	35	Basement – Electrical Room	2x4 Fissured Ceiling Tile	1	Non-Friable	None Detected	None Detected
87	35	1st Floor – Cafeteria	2x4 Fissured Ceiling Tile	1	Non-Friable	None Detected	None Detected
88	36	Basement – Electrical Room	Concrete Wall	1	Friable	None Detected	None Detected
89	36	Basement – Electrical Room	Concrete Wall	1	Friable	None Detected	None Detected
90	36	Basement – Electrical Room	Concrete Wall	1	Friable	None Detected	None Detected
91	37	Basement – Electrical Room	CMU	1	Friable	None Detected	None Detected
92	37	1st Floor – Cafeteria	CMU	1	Friable	None Detected	None Detected
93	38	Basement – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected

SAMPLE ID	HA	SAMPLE LOCATION	MATERIAL DESCRIPTION	EST. # OF LAYERS	FRIABLE/ NON-FRIABLE	LAB RESULTS	
						%Asbestos	%Vermiculite
94	38	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected
95	38	1st Floor – Cafeteria	CMU – Mortar	1	Friable	None Detected	None Detected

Survey Field Notes:

The following was noted during the survey process:

- The inspection was limited and partial to the specific SOW detailed on drawings for each building.
- AC units being installed and replaced.
- Some radiators are being upgraded, but the unit itself won't be replaced or removed.
- **Follow-up visit is needed for roof testing.**
- **No probe cuts or selective demolition conducted to access concealed ACM.**

Exclusions/exemptions/assumptions

The following areas/materials were found to be inaccessible:

- N/A

Next Step in Asbestos Survey Process:

POSITIVE MATERIAL(S) DELINEATED

The following positive ACM was delineated:

TABLE 3: POSITIVE MATERIAL SUMMARY			
LOCATION	MATERIAL DESCRIPTION	ASSESSED CONDITION	ESTIMATED QUANTITY* (square/linear feet)
Liberty Elementary School 1st Floor – Cafeteria Storage Room	Fittings	No Visible Damage	Approx. 4 LF + possible additional concealed TSI/ACM
Roofs (All Schools)	PACM Roofing Materials	-	TBD
Additional Concealed ACM	Fittings, etc.	-	TBD
*Since many asbestos materials continue through adjoining areas and/or layers, final estimated quantities of abatement scope have to be determined in the field when project details are confirmed.			

Since the subject delineated ACM is going to be removed or otherwise disturbed based upon drawings provided dated 04/08/2022, an "Asbestos Abatement Work Plan" should be developed so that an abatement Contractor can be retained to perform the work. ACM must be removed prior to the onset of general trade work and can impact overall project schedule.

Material condition classification "significantly damaged" would trigger immediate clean-up of damaged ACM.

If additional materials are exposed, then additional asbestos investigation will be required.

If you or your associates have any questions regarding this report, please contact office @ 201.489.8700.

Attachments:

- *Copies of survey personnel and company asbestos license*
- *Survey photo-documentation*
- *Laboratory analysis reports with chain-of-custody*
- *Scope of work drawing provided by Client*

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New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Omega Laboratories, Inc.

280 Huyler Street

S. Hackensack, NJ 07606

FILE NUMBER: 99-0200
LICENSE NUMBER: 29673
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 03/04/2022
EXPIRATION DATE: 03/31/2023

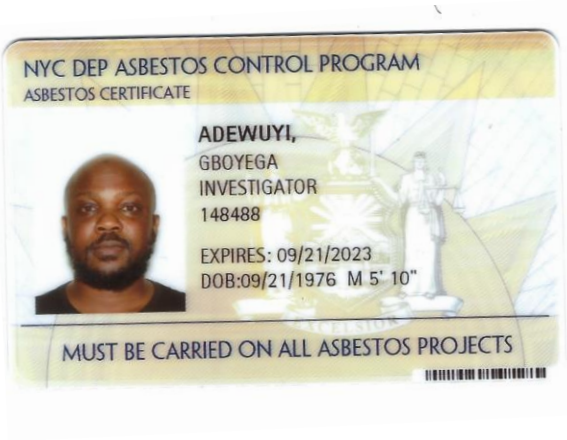
Duly Authorized Representative – Gary Mellor:

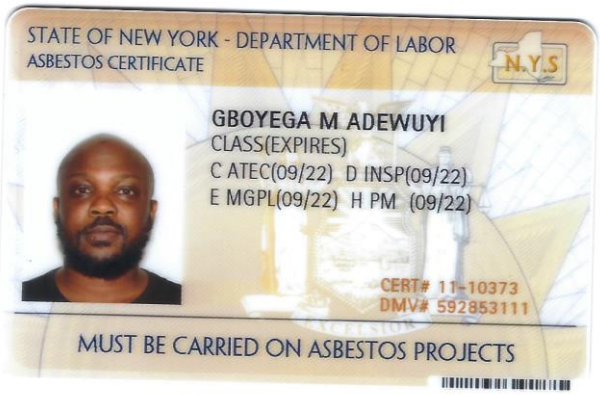
This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)


NYC DEP ASBESTOS CONTROL PROGRAM
ASBESTOS CERTIFICATE
ADEWUYI,
GBOYEGA
INVESTIGATOR
148488
EXPIRES: 09/21/2023
DOB:09/21/1976 M 5' 10"
MUST BE CARRIED ON ALL ASBESTOS PROJECTS


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
GBOYEGA M ADEWUYI
CLASS(EXPIRES)
C ATEC(09/22) D INSP(09/22)
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DMV# 592853111
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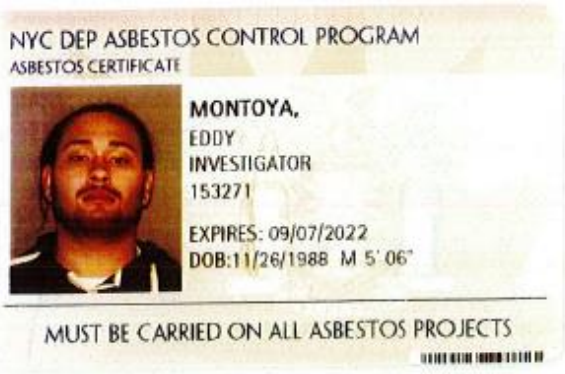
NYC DEP ASBESTOS CONTROL PROGRAM
ASBESTOS CERTIFICATE
MONTOYA,
EDDY
INVESTIGATOR
153271
EXPIRES: 09/07/2022
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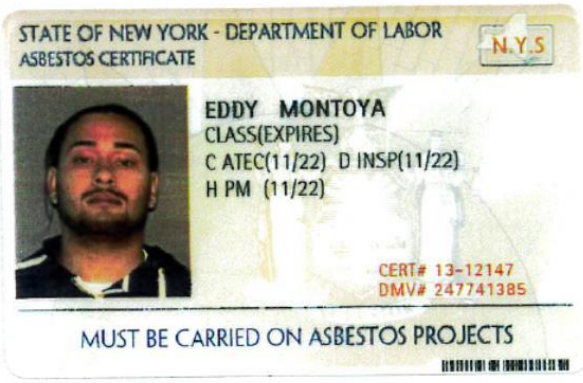
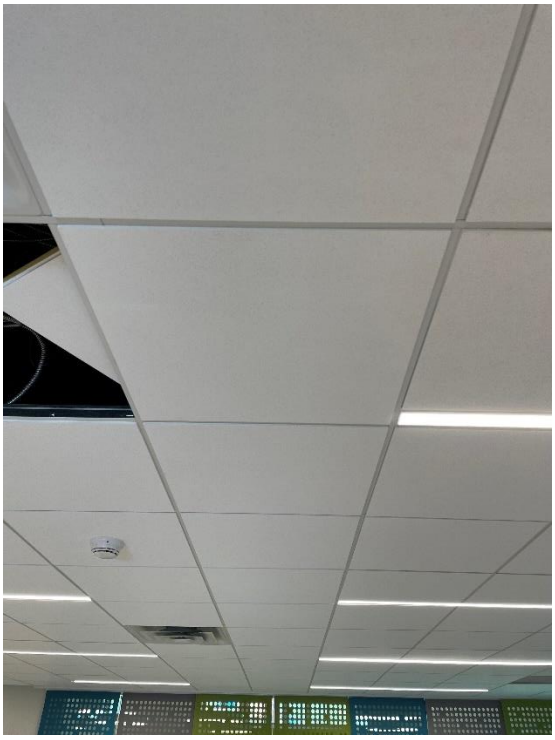

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
EDDY MONTOYA
CLASS(EXPIRES)
C ATEC(11/22) D INSP(11/22)
H PM (11/22)
CERT# 13-12147
DMV# 247741385
MUST BE CARRIED ON ASBESTOS PROJECTS

Upper Nyack Elementary School Photos



2x2 Soft Ceiling Tile

2x4 Pinhole Ceiling Tile

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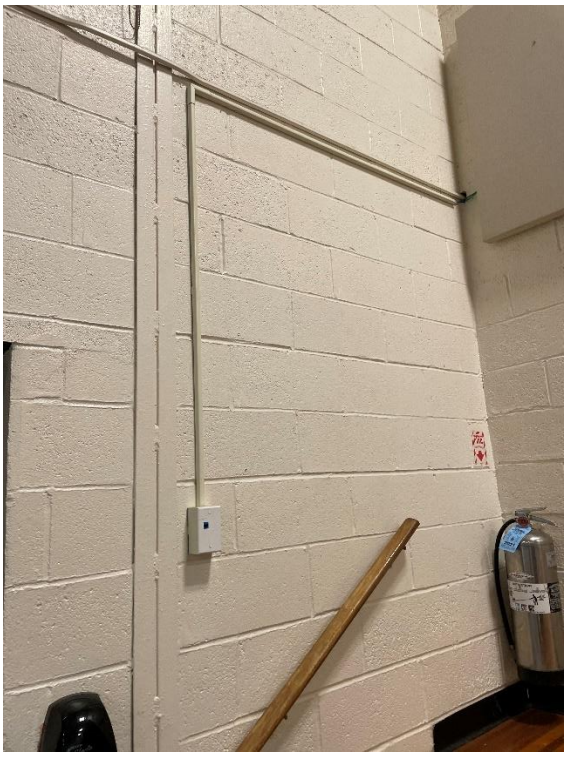

CMU and Mortar

Cube CMU & Mortar

Drywall & Joint Compound

Exterior Brick & Mortar

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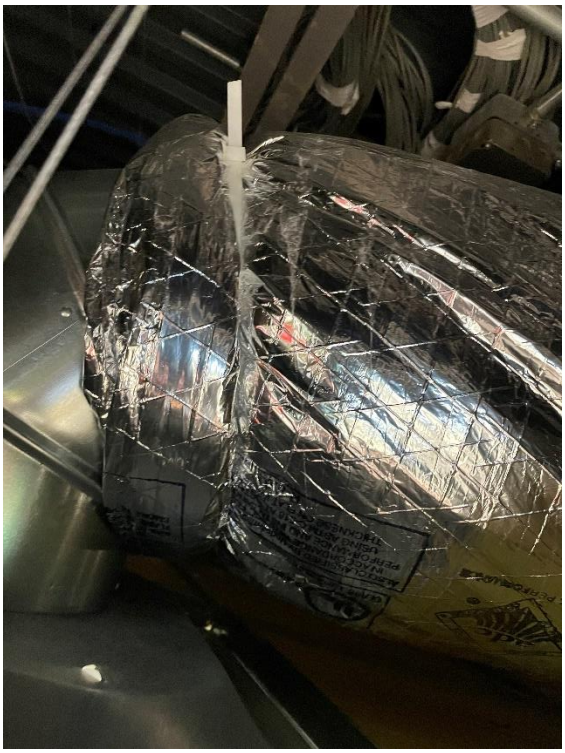
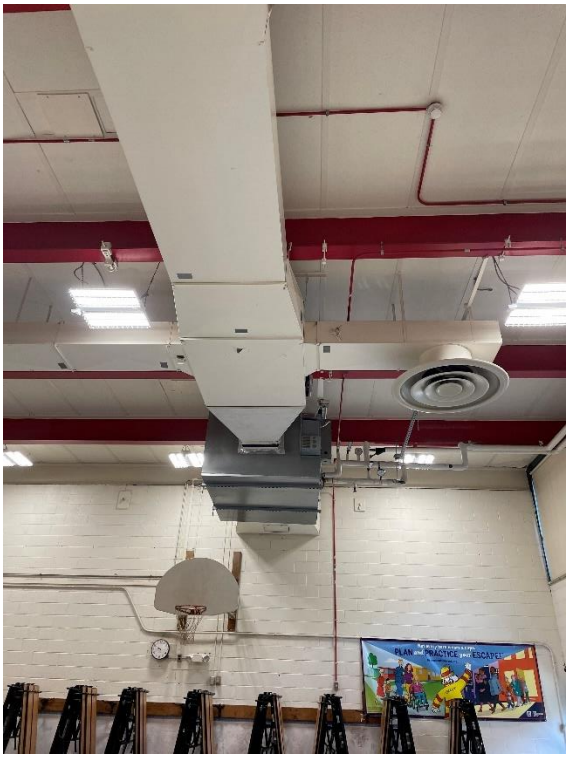
Fiberglass Pipe Wrap



Flex Duct System

Valley Cottage Elementary School Photos

2x2 Soft Ceiling Tile



CMU and Mortar

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Cube CMU and Mortar

Exterior Brick & Mortar

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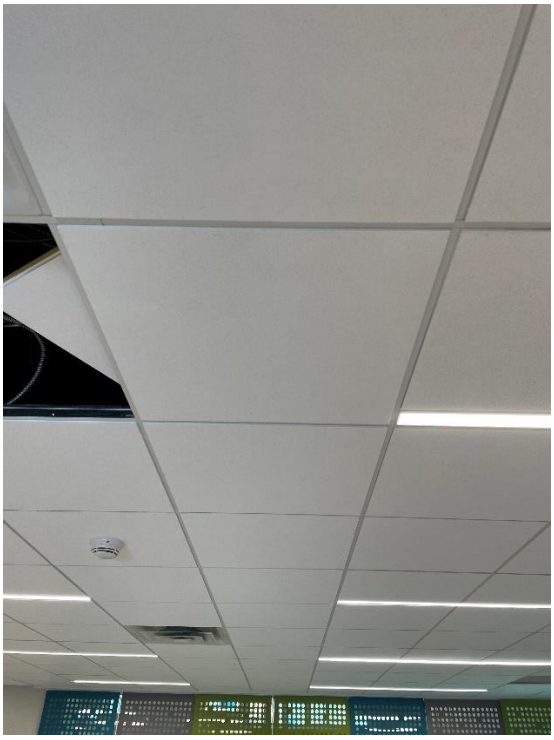
Fiberglass Pipe Insulation Wrap

Fire Stop Caulk – Red

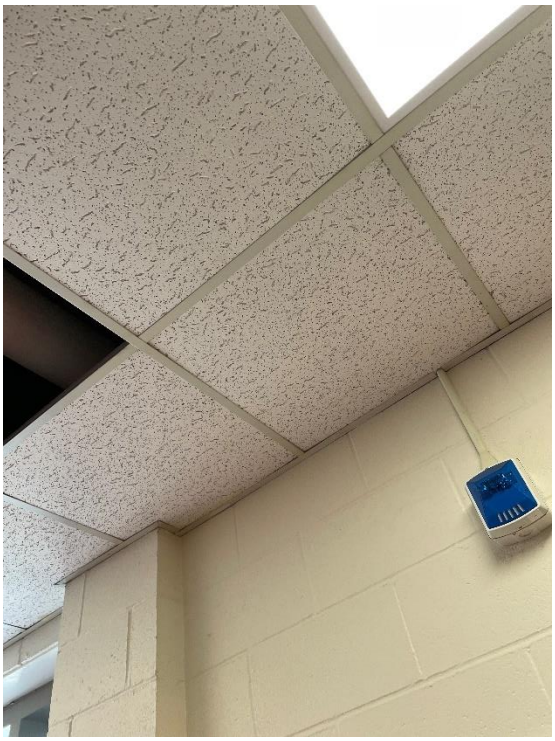
No Duct Insulation

Radiator

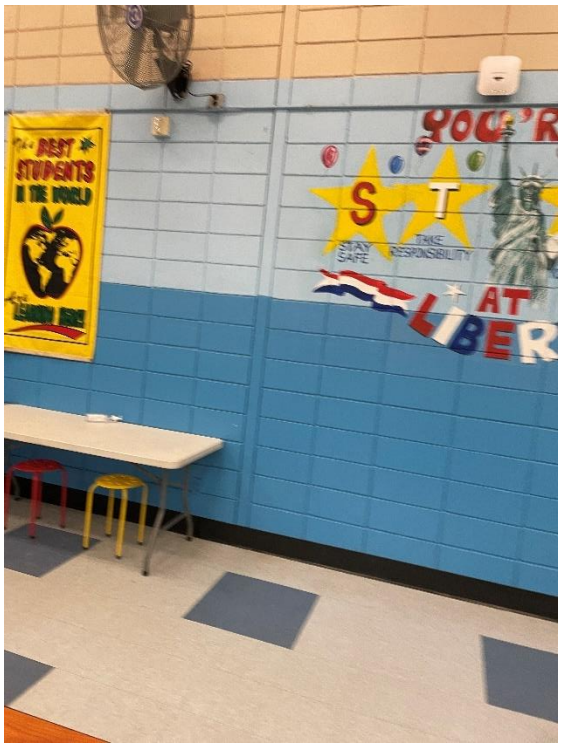
Liberty Elementary School Photos



2x2 Soft Ceiling Tile

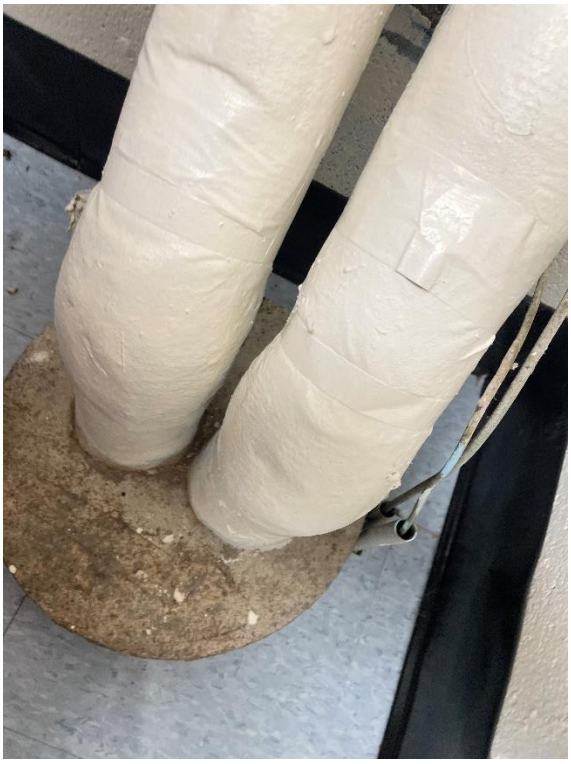


2x4 Fissured Ceiling Tile



CMU & Mortar

Cube CMU and Mortar



Fiberglass Pipe Insulation and Fittings

Non-Insulated Radiators

Nyack Middle School Photos

1x2 Ceiling Tile

2x4 Fissured Ceiling Tile

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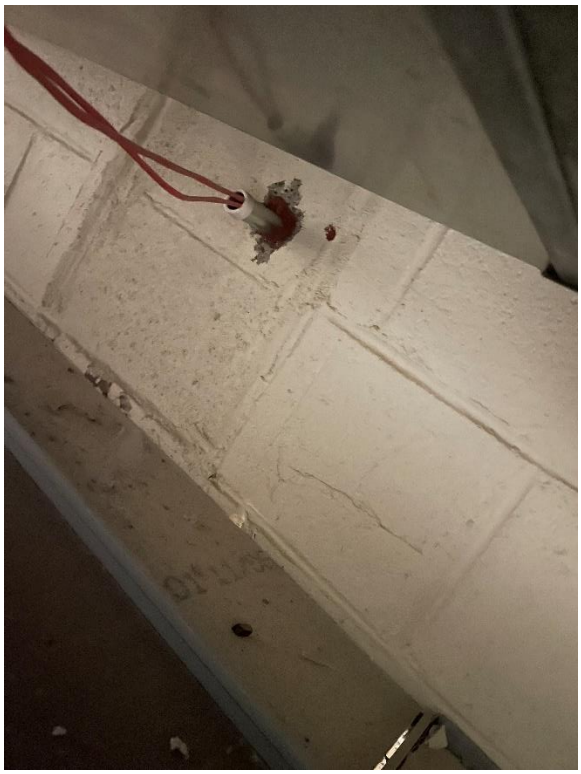

CMU Mortar and Fire Stop Caulk

Concrete Slab

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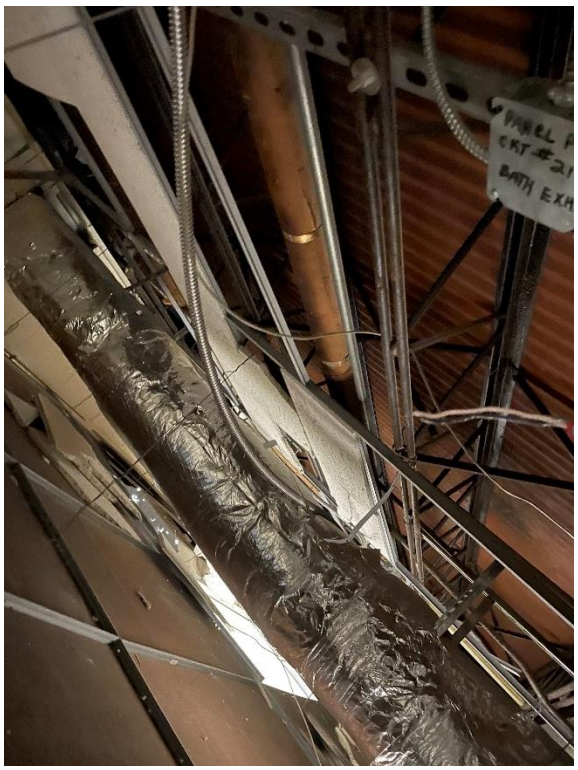
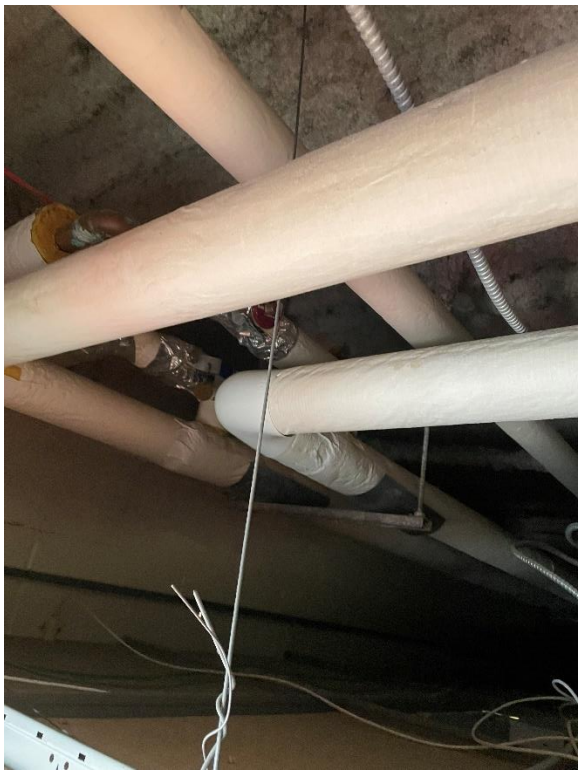


Fiberglass Duct Insulation Wrap & Old Fiberglass Pipe Wrap



Fiberglass Pipe Insulation Wrap

SOFP

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BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 336 North Broadway **Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
1	A	GR	E		1st Floor, Library, Cube CMU	100.00	NAD							NAD
	B	1	F											
22-06-116-01	C	198.1	G											
	D		H											
2	A	GR	E		1st Floor, Library, Cube CMU	100.00	NAD							NAD
	B	1	F											
22-06-116-02	C	198.1	G											
	D		H											
3	A	GR	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-116-03	C	198.1	G											
	D		H											
4	A	GR	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-116-04	C	198.1	G											
	D		H											
5	A	GR	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-116-05	C	198.1	G											
	D		H											
6	A	GR	E	8	1st Floor, Library, Drywall	92.00	NAD							NAD
	B	1	F											
22-06-116-06	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 336 North Broadway	**Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% AII	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
7	A	GR	E	8	1st Floor, Library, Drywall	92.00	NAD							NAD
	B	1	F											
22-06-116-07	C	198.1	G											
	D		H											
8	A	WH	E		1st Floor, Library, Joint Compound	100.00	NAD							NAD
	B	1	F											
22-06-116-08	C	198.1	G											
	D		H											
9	A	WH	E		1st Floor, Library, Joint Compound	100.00	NAD							NAD
	B	1	F											
22-06-116-09	C	198.1	G											
	D		H											
10	A	WH	E		1st Floor, Library, Joint Compound	100.00	NAD							NAD
	B	1	F											
22-06-116-10	C	198.1	G											
	D		H											
11	A	WH/S	E	5	1st Floor, Library, Fiberglass Pipe Insulation Wrap	45.00	NAD							NAD
	B	2	F											
22-06-116-11	C	198.1	G											
	D	50	H											
12	A	WH/S	E	5	1st Floor, Library, Fiberglass Pipe Insulation Wrap	45.00	NAD							NAD
	B	2	F											
22-06-116-12	C	198.1	G											
	D	50	H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 336 North Broadway	**Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
13	A	WH/S	E	5		1st Floor, Cafeteria, Fiberglass Pipe Insulation Wrap	45.00	NAD							NAD
22-06-116-13	B	2	F												
	C	198.1	G												
	D	50	H												
14	A	GR	E			1st Floor, Cafeteria, 2x4 Pinhole - Ceiling Tile				73.82	INC. NAD		NAD		NAD
22-06-116-14	B	1	F												
	C	198.4/6	G												
	D		H												
15	A	GR	E			1st Floor, Cafeteria, 2x4 Pinhole - Ceiling Tile				76.27	INC. NAD		NAD		NAD
22-06-116-15	B	1	F												
	C	198.4/6	G												
	D		H												
16	A	WH/Y	E			1st Floor, Library, 2x2 Ceiling Tile - Soft				54.62	INC. NAD		NAD		NAD
22-06-116-16	B	2	F												
	C	198.4/6	G												
	D		H												
17	A	WH/Y	E			1st Floor, Library, 2x2 Ceiling Tile - Soft				65.18	INC. NAD		NAD		NAD
22-06-116-17	B	2	F												
	C	198.4/6	G												
	D		H												
18	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD							NAD
22-06-116-18	B	1	F												
	C	198.1	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 336 North Broadway **Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% AII	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
19 22-06-116-19	A	GR	E		1st Floor, Cafeteria, CMU	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
20 22-06-116-20	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
21 22-06-116-21	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
22 22-06-116-22	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
23 22-06-116-23	A	R	E		1st Floor, Exterior by Library, Red Brick	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
24 22-06-116-24	A	R	E		1st Floor, Exterior by Library, Red Brick	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 336 North Broadway	**Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
25 22-06-116-25	A	BE	E		1st Floor, Exterior by Library, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
26 22-06-116-26	A	BE	E		1st Floor, Exterior by Library, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											
27 22-06-116-27	A	BE	E		1st Floor, Exterior by Library, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 336 North Broadway **Proj#:** 22-1181
Laboratory ID: 22-06-116	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

PLM ANALYST	PLM-NOB ANALYST	TEM-NOB ANALYST	LABORATORY DIRECTOR
Y. Zhao	Y. Zhao		M. Young

LABORATORY ACCREDITATION NUMBERS: NYSDOH ELAP LAB ID 12005 and NVLAP Lab Code 600233-0

- *TEM-NOB was subcontracted and analysis was performed by Laboratory Testing Services Inc. at 45-09 Greenpoint Ave, LIC, NY 11104 ELAP ID # 10955, NVLAP Lab Code 101958, Director: Emanuel Dimitrakas
- Samples will be stored for sixty (60) days. LTS Inc. should be notified within this time frame for a true duplicate analysis.
- Above results relate only to samples submitted and analyzed. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any U.S. Government agency. Test reports may not be reproduced except in full and with prior approval of LTS Inc.
- ELAP 6.3.2.2. Polarized-light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- The liability of LTS Inc., with respect to the services charged, shall in no event exceed the amount of the invoice.
- Analytical Methodologies: ELAP Method 198.1, 198.6, EPA 600/M4-82-020, as found in 40 CFR, Part 763, App E to Subpart E, and EPA/600/R-93/116 (Point Count only).
- INC.: Inconclusive, NAD: No Asbestos Detected, NVD: No Vermiculite Detected, SAFP: Stop at First Positive
- CH: Chrysotile, AMOS: Amosite,TRE: Tremolite, ANTH: Anthophyllite, ACT: Actinolite, and CRO: Crocidolite.
- Stereomicroscopic Analysis: A: Color, B: Layers, C: Methodology, D: Cellulose, E: Fiberglass, F: Hair, G: Vermiculite, H: OTHER
- Color: BK: Black, BR: Brown, Dk BR: Dark Brown, Lt BR: Light Brown, R BR: Reddish Brown, GR: Gray, Dk GR: Dark Gray, Lt GR: Light Gray, BE: Beige, P: Pink, R: Red, T: Tan, WH: White, Off WH: Off White, Y: Yellow, BL: Blue, CR: Cream, GN: Green, O: Orange, Multi.: Multiple Colors

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

22-06-116

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

email results to: lab@omega-env.com and eddym@omega-env.com

Project Name:	KGD Architects Upper Nyack Elementary School
Project #	22-1181
Site Location:	336 North Broadway Nyack, Ny 10989
Sampled By:	Eddy Montoya 13-12147/153271
Date Sampled:	6/18/2022 8:00AM - 11:00AM

Turnaround Time Requested:	24 Hr TAT
Total # of Samples:	1 - 27 of 27
Analyze by each individual layer or as indicated	✓
Analyze all samples without 1st positive stop	☐
Stop after 1st positive for each homogeneous area	✓

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
1		1st Floor	Library	1	Cube CMU	NVD	860 SF	1	✓	☐	☐	☐	(-)NAD
2		1st Floor	Library	1	Cube CMU	NVD	↓	1	✓	☐	☐	☐	↓
3		1st Floor	Library	2	Cube CMU - Mortar	NVD	↓	1	✓	☐	☐	☐	(-)NAD
4		1st Floor	Library	2	Cube CMU - Mortar	NVD	↓	1	✓	☐	☐	☐	↓
5		1st Floor	Library	2	Cube CMU - Mortar	NVD	↓	1	✓	☐	☐	☐	↓
6		1st Floor	Library	3	Drywall	NVD	180 SF	1	✓	☐	☐	☐	(-)NAD
7		1st Floor	Library	3	Drywall	NVD	↓	1	✓	☐	☐	☐	↓
8		1st Floor	Library	4	Joint Compound	NVD	↓	1	✓	☐	☐	☐	(-)NAD
9		1st Floor	Library	4	Joint Compound	NVD	↓	1	✓	☐	☐	☐	↓
10		1st Floor	Library	4	Joint Compound	NVD	↓	1	✓	☐	☐	☐	↓
11		1st Floor	Library	5	Fiberglass Pipe Insulation Wrap	NVD	60 Ln FT	1	✓	☐	☐	☐	(-)NAD
12		1st Floor	Library	5	Fiberglass Pipe Insulation Wrap	NVD	↓	1	✓	☐	☐	☐	↓
13		1st Floor	Cafeteria	5	Fiberglass Pipe Insulation Wrap	NVD	20 Ln Ft	1	✓	☐	☐	☐	↓
14		1st Floor	Cafeteria	6	2x4 Pinhole - Ceiling Tile	NVD	1,500 Sf	1	☐	✓	✓	☐	(-)NAD, (-)NAD
15		1st Floor	Cafeteria	6	2x4 Pinhole - Ceiling Tile	NVD	↓	1	☐	✓	✓	☐	↓ ↓
16		1st Floor	Library	7	2x2 Ceiling Tile - Soft	NVD	1,110 SF	1	☐	✓	✓	☐	
17		1st Floor	Library	7	2x2 Ceiling Tile - Soft	NVD	↓	1	☐	✓	✓	☐	
18		1st Floor	Cafeteria	8	CMU	NVD	800 SF	1	✓	☐	☐	☐	(-)NAD

Relinquished By & Company:	Eddy Montoya	Omega Environmetal
Date & Time:	6/18/22	11:00AM

Received By Company:	
Date & Time:	6/21/22
Analyzed By:	
Date & Time:	6/21/22/22

23 plm 4 TEM/PLM NOB.

22-06-116

OMEGA ENVIRONMENTAL SERVICES, INC

280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

Project #: 22-1181

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
19		1st Floor	Cafeteria	8	CMU	NVD	800 SF	1	☑	☐	☐	☐	(-)NAD
20		1st Floor	Cafeteria	9	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	(-)NAD
21		1st Floor	Cafeteria	9	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
22		1st Floor	Cafeteria	9	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
23		1st Floor	Exterior By Library	10	Red Brick	NVD	860 SF	1	☑	☐	☐	☐	(-)NAD
24		1st Floor	Exterior By Library	10	Red Brick	NVD	↓	1	☑	☐	☐	☐	↓
25		1st Floor	Exterior By Library	11	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	(-)NAD
26		1st Floor	Exterior By Library	11	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
27		1st Floor	Exterior By Library	11	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
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									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	

Relinquished By & Company:	Eddy Montoya [signature]	Omega Environmetal	
Date & Time:	6/18/22	11:00AM	

Received By Company:	[signature]
Date & Time:	6/21/22

Analyzed By:	[signature]
Date & Time:	6/21,22/22

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 28 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-117	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results	% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
28 22-06-117-01	A	R	E			1st Floor, Cafeteria, Fire Stop Caulk - Red			16.84	INC. NAD		NAD		NAD
	B	1	F											
	C	198.4/6	G											
	D		H											
29 22-06-117-02	A	R	E			1st Floor, Cafeteria, Fire Stop Caulk - Red			24.90	INC. NAD		NAD		NAD
	B	1	F											
	C	198.4/6	G											
	D		H											
30 22-06-117-03	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD						NAD
	B	1	F											
	C	198.1	G											
	D		H											
31 22-06-117-04	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD						NAD
	B	1	F											
	C	198.1	G											
	D		H											
32 22-06-117-05	A	GR	E			1st Floor, Cafeteria, CMU - Mortar	100.00	NAD						NAD
	B	1	F											
	C	198.1	G											
	D		H											
33 22-06-117-06	A	GR	E			1st Floor, Cafeteria, CMU - Mortar	100.00	NAD						NAD
	B	1	F											
	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 28 Lake Road **Proj#:** 22-1181
Laboratory ID: 22-06-117	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% AII	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
34	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
22-06-117-07	B	1	F											
	C	198.1	G											
	D		H											
35	A	GR	E		1st Floor, Library, Cube CMU	100.00	NAD							NAD
22-06-117-08	B	1	F											
	C	198.1	G											
	D		H											
36	A	GR	E		1st Floor, Library, Cube CMU	100.00	NAD							NAD
22-06-117-09	B	1	F											
	C	198.1	G											
	D		H											
37	A	BE	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-117-10	B	1	F											
	C	198.1	G											
	D		H											
38	A	GR	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-117-11	B	1	F											
	C	198.1	G											
	D		H											
39	A	GR	E		1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-117-12	B	1	F											
	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 28 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-117	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
40	A	WH/S	E	20		1st Floor, Library, Fiberglass Pipe Insulation Wrap	40.00	NAD							NAD
	B	2	F												
22-06-117-13	C	198.1	G												
	D	40	H												
41	A	WH/S	E	20		1st Floor, Library, Fiberglass Pipe Insulation Wrap	40.00	NAD							NAD
	B	2	F												
22-06-117-14	C	198.1	G												
	D	40	H												
42	A	WH/S	E	20		1st Floor, Library, Fiberglass Pipe Insulation Wrap	40.00	NAD							NAD
	B	2	F												
22-06-117-15	C	198.1	G												
	D	40	H												
43	A	WH/Y	E			1st Floor, Library, 2x2 Soft Ceiling Tile				49.69	INC. NAD		NAD		NAD
	B	2	F												
22-06-117-16	C	198.4/6	G												
	D		H												
44	A	WH/Y	E			1st Floor, Library, 2x2 Soft Ceiling Tile				54.55	INC. NAD		NAD		NAD
	B	2	F												
22-06-117-17	C	198.4/6	G												
	D		H												
45	A	R	E			1st Floor, Exterior, Red Brick	100.00	NAD							NAD
	B	1	F												
22-06-117-18	C	198.1	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 28 Lake Road **Proj#:** 22-1181
Laboratory ID: 22-06-117	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
46	A	R	E		1st Floor, Exterior - Façade, Red Brick	100.00	NAD							NAD
	B	1	F											
22-06-117-19	C	198.1	G											
	D		H											
47	A	BE	E		1st Floor, Exterior - Façade, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-117-20	C	198.1	G											
	D		H											
48	A	BE	E		1st Floor, Exterior - Façade, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-117-21	C	198.1	G											
	D		H											
49	A	BE	E		1st Floor, Exterior - Façade, Red Brick - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-117-22	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 28 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-117	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22	

PLM ANALYST	PLM-NOB ANALYST	TEM-NOB ANALYST	LABORATORY DIRECTOR
Y. Zhao	Y. Zhao		M. Young

LABORATORY ACCREDITATION NUMBERS: NYSDOH ELAP LAB ID 12005 and NVLAP Lab Code 600258-0

- *TEM-NOB was subcontracted and analysis was performed by Laboratory Testing Services Inc. at 45-09 Greenpoint Ave, LIC, NY 11104 ELAP ID # 10955, NVLAP Lab Code 101958, Director: Emanuel Dimitrakas
- Samples will be stored for sixty (60) days. LTS Inc. should be notified within this time frame for a true duplicate analysis.
- Above results relate only to samples submitted and analyzed. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any U.S. Government agency. Test reports may not be reproduced except in full and with prior approval of LTS Inc.
- ELAP 6.3.2.2. Polarized-light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- The liability of LTS Inc., with respect to the services charged, shall in no event exceed the amount of the invoice.
- Analytical Methodologies: ELAP Method 198.1, 198.6, EPA 600/M4-82-020, as found in 40 CFR, Part 763, App E to Subpart E, and EPA/600/R-93/116 (Point Count only).
- INC.: Inconclusive, NAD: No Asbestos Detected, NVD: No Vermiculite Detected, SAFP: Stop at First Positive
- CH: Chrysotile, AMOS: Amosite,TRE: Tremolite, ANTH: Anthophyllite, ACT: Actinolite, and CRO: Crocidolite.
- Stereomicroscopic Analysis: A: Color, B: Layers, C: Methodology, D: Cellulose, E: Fiberglass, F: Hair, G: Vermiculite, H: OTHER
- Color: BK: Black, BR: Brown, Dk BR: Dark Brown, Lt BR: Light Brown, R BR: Reddish Brown, GR: Gray, Dk GR: Dark Gray, Lt GR: Light Gray, BE: Beige, P: Pink, R: Red, T: Tan, WH: White, Off WH: Off White, Y: Yellow, BL: Blue, CR: Cream, GN: Green, O: Orange, Multi.: Multiple Colors

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

22-06-[illegible]

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

email results to: lab@omega-env.com and eddym@omega-env.com

Project Name:	KGD Architects Valley Cottage Elementary School
Project #	22-1181
Site Location:	28 Lake Road, Valley Cottage Ny 10989
Sampled By:	Eddy Montoya 13-12147/153271
Date Sampled:	6/18/2022

Turnaround Time Requested:	24 Hr TAT
Total # of Samples: 22 Samples.	28 - 49 of 49
Analyze by each individual layer or as indicated	☑
Analyze all samples without 1st positive stop	☐
Stop after 1st positive for each homogeneous area	☑

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
28	1	1st Floor	Cafeteria	12	Fire Stop Caulk - Red	NVD	5 SF	1	☐	☑	☑	☐	C-NAD, C-NAD
29	2	1st Floor	Cafeteria	12	Fire Stop Caulk - Red	NVD	↓	1	☐	☑	☑	☐	↓ ↓
30	3	1st Floor	Cafeteria	13	CMU	NVD	780 SF	1	☑	☐	☐	☐	C-NAD
31	4	1st Floor	Cafeteria	13	CMU	NVD	↓	1	☑	☐	☐	☐	↓
32	5	1st Floor	Cafeteria	14	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	C-NAD
33	6	1st Floor	Cafeteria	14	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
34	7	1st Floor	Cafeteria	14	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
35	8	1st Floor	Library	15	Cube CMU	NVD	660 SF	1	☑	☐	☐	☐	C-NAD
36	9	1st Floor	Library	15	Cube CMU	NVD	↓	1	☑	☐	☐	☐	↓
37	10	1st Floor	Library	16	Cube Cmu - Mortar	NVD	↓	1	☑	☐	☐	☐	C-NAD
38	11	1st Floor	Library	16	Cube Cmu - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
39	12	1st Floor	Library	16	Cube Cmu - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
40	13	1st Floor	Library	17	Fiberglass Pipe Insulation Wrap	NVD	40 Ln FT	1	☑	☐	☐	☐	C-NAD
41	14	1st Floor	Library	17	Fiberglass Pipe Insulation Wrap	NVD	↓	1	☑	☐	☐	☐	↓
42	15	1st Floor	Library	17	Fiberglass Pipe Insulation Wrap	NVD	↓	1	☑	☐	☐	☐	↓
43	16	1st Floor	Library	18	2x2 Soft Ceiling Tile	NVD	1,200 SF	1	☐	☑	☑	☐	C-NAD, C-NAD
44	17	1st Floor	Library	18	2x2 Soft Ceiling Tile	NVD	↓	1	☐	☑	☑	☐	↓ ↓
45	18	1st Floor	Exterior	19	Red Brick	NVD	600 SF	1	☑	☐	☐	☐	C-NAD

Relinquished By & Company:	Eddy Montoya [signature]	Omega Environmental
Date & Time:	6-18-22	14:30 PM

Received By Company:	[signature]
Date & Time:	6/21/22

Analyzed By:	[illegible]
Date & Time:	6/21,22/22

18 Plm 4 PLM/TEM NOB.

22-06-117

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

Project #: 22-1181

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
46	19	1st Floor	Exterior - Façade	19	Red Brick	NVD	600 SF	1	☑	☐	☐	☐	(-)NAD
47	20	1st Floor	Exterior - Façade	20	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	(-)NAD
48	21	1st Floor	Exterior - Façade	20	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
49	22	1st Floor	Exterior - Façade	20	Red Brick - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	
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									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	

Relinquished By & Company:	Eddy Montoya [signature]	Omega Environmental
Date & Time:	6-18-22	14:30 PM

Received By Company:	[signature]
Date & Time:	6/21/22
Analyzed By:	[signature]
Date & Time:	6/21, 22/22

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 142 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-118	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
50	A	WH/S	E	20		1st Floor, Cafeteria, Fiberglass Pipe Insulation - Wrap	40.00	NAD							NAD
22-06-118-01	B	2	F												
	C	198.1	G												
	D	40	H												
51	A	WH/S	E	20		1st Floor, Cafeteria, Fiberglass Pipe Insulation - Wrap	40.00	NAD							NAD
22-06-118-02	B	2	F												
	C	198.1	G												
	D	40	H												
52	A	WH/S	E	20		1st Floor, Library, Fiberglass Pipe Insulation - Wrap	40.00	NAD							NAD
22-06-118-03	B	2	F												
	C	198.1	G												
	D	40	H												
53	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD							NAD
22-06-118-04	B	1	F												
	C	198.1	G												
	D		H												
54	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD							NAD
22-06-118-05	B	1	F												
	C	198.1	G												
	D		H												
55	A	GR	E			1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
22-06-118-06	B	1	F												
	C	198.1	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 142 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-118	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
56	A	BR	E			1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
22-06-118-07	B	1	F												
	C	198.1	G												
	D		H												
57	A	BR	E			1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
22-06-118-08	B	1	F												
	C	198.1	G												
	D		H												
58	A	GR	E			1st Floor, Library, Cube CMU	100.00	NAD							NAD
22-06-118-09	B	1	F												
	C	198.1	G												
	D		H												
59	A	GR	E			1st Floor, Library, Cube CMU	100.00	NAD							NAD
22-06-118-10	B	1	F												
	C	198.1	G												
	D		H												
60	A	GR	E			1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-118-11	B	1	F												
	C	198.1	G												
	D		H												
61	A	GR	E			1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-118-12	B	1	F												
	C	198.1	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 142 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-118	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
62	A	GR	E			1st Floor, Library, Cube CMU - Mortar	100.00	NAD							NAD
22-06-118-13	B	1	F												
	C	198.1	G												
	D		H												
63	A	BE	E	15		1st Floor, Cafeteria - Storage Room, Fittings	83.25	1.75	CH						1.8
22-06-118-14	B	1	F												
	C	198.1	G												
	D		H												
64	A		E			1st Floor, Cafeteria - Storage Room, Fittings		NA							SAFP
22-06-118-15	B		F												
	C		G												
	D		H												
65	A		E			1st Floor, Cafeteria - Storage Room, Fittings		NA							SAFP
22-06-118-16	B		F												
	C		G												
	D		H												
66	A	GR	E			1st Floor, Cafeteria, 2x4 Fissured Ceiling Tile				69.57	INC. NAD		NAD		NAD
22-06-118-17	B	1	F												
	C	198.4/6	G												
	D		H												
67	A	GR	E			1st Floor, Cafeteria, 2x4 Fissured Ceiling Tile				71.59	INC. NAD		NAD		NAD
22-06-118-18	B	1	F												
	C	198.4/6	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 142 Lake Road **Proj#:** 22-1181
Laboratory ID: 22-06-118	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% AII	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
68	A	WH/Y	E		1st Floor, Library, 2x2 Soft Ceiling Tile				50.00	INC. NAD		NAD		NAD
22-06-118-19	B	2	F											
	C	198.4/6	G											
	D		H											
69	A	WH/Y	E		1st Floor, Library, 2x2 Soft Ceiling Tile				52.97	INC. NAD		NAD		NAD
22-06-118-20	B	2	F											
	C	198.4/6	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 142 Lake Road	**Proj#:** 22-1181
Laboratory ID: 22-06-118	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22	

PLM ANALYST	PLM-NOB ANALYST	TEM-NOB ANALYST	LABORATORY DIRECTOR
Y. Zhao	Y. Zhao		M. Young

LABORATORY ACCREDITATION NUMBERS: NYSDOH ELAP LAB ID 12005 and NVLAP Lab Code 600253-0

- *TEM-NOB was subcontracted and analysis was performed by Laboratory Testing Services Inc. at 45-09 Greenpoint Ave, LIC, NY 11104 ELAP ID # 10955, NVLAP Lab Code 101958, Director: Emanuel Dimitrakas
- Samples will be stored for sixty (60) days. LTS Inc. should be notified within this timeframe for a true duplicate analysis.
- Above results relate only to samples submitted and analyzed. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any U.S. Government agency. Test reports may not be reproduced except in full and with prior approval of LTS Inc.
- ELAP 6.3.2.2. Polarized-light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- The liability of LTS Inc., with respect to the services charged, shall in no event exceed the amount of the invoice.
- Analytical Methodologies: ELAP Method 198.1, 198.6, EPA 600/M4-82-020, as found in 40 CFR, Part 763, App E to Subpart E, and EPA/600/R-93/116 (Point Count only).
- INC.: Inconclusive, NAD: No Asbestos Detected, NVD: No Vermiculite Detected, SAFP: Stop at First Positive
- CH: Chrysotile, AMOS: Amosite,TRE: Tremolite, ANTH: Anthophyllite, ACT: Actinolite, and CRO: Crocidolite.
- Stereomicroscopic Analysis: A: Color, B: Layers, C: Methodology, D: Cellulose, E: Fiberglass, F: Hair, G: Vermiculite, H: OTHER
- Color: BK: Black, BR: Brown, Dk BR: Dark Brown, Lt BR: Light Brown, R BR: Reddish Brown, GR: Gray, Dk GR: Dark Gray, Lt GR: Light Gray, BE: Beige, P: Pink, R: Red, T: Tan, WH: White, Off WH: Off White, Y: Yellow, BL: Blue, CR: Cream, GN: Green, O: Orange, Multi.: Multiple Colors

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

22-06-118

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

email results to: lab@omega-env.com and eddym@omega-env.com

Project Name:	KGD & Architects Liberty Elemteray School
Project #	22-1181
Site Location:	142 Lake Road Valley Cottage Ny 10989
Sampled By:	Eddy Montoya 13-12147/153271
Date Sampled:	6/18/22 15:00 - 18:00

Turnaround Time Requested:	24 Hr TAT
Total # of Samples: 80 Samples	50 - 69 of 69
Analyze by each individual layer or as indicated	☑
Analyze all samples without 1st positive stop	☐
Stop after 1st positive for each homogeneous area	☑

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
50	1	1st Floor	Cafeteria	21	Fiberglass Pipe Insulation - Wrap	NVD	180 Ln Ft	1	☑	☐	☐	☐	C-NAD
51	2	1st Floor	Cafeteria	21	Fiberglass Pipe Insulation - Wrap	NVD	↓	1	☑	☐	☐	☐	↓
52	3	1st Floor	Library	21	Fiberglass Pipe Insulation - Wrap	NVD	30 Ln FT	1	☑	☐	☐	☐	
53	4	1st Floor	Cafeteria	22	CMU	NVD	760 SF	1	☑	☐	☐	☐	C-NAD
54	5	1st Floor	↓	22	CMU	NVD	↓	1	☑	☐	☐	☐	↓
55	6	1st Floor	↓	23	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	C-NAD
56	7	1st Floor	↓	23	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
57	8	1st Floor	↓	23	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	
58	9	1st Floor	Library	24	Cube CMU	NVD	650 SF	1	☑	☐	☐	☐	C-NAD
59	10	1st Floor	↓	24	Cube CMU	NVD	↓	1	☑	☐	☐	☐	↓
60	11	1st Floor	↓	25	Cube CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	C-NAD
61	12	1st Floor	↓	25	Cube CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
62	13	1st Floor	↓	25	Cube CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	
63	14	1st Floor	Cafeteria - Storage Rm	26	Fittings	NVD	4 Ln FT	1	☑	☐	☐	☐	C-1.7%CH
64	15	1st Floor	Cafeteria - Storage Rm	26	Fittings	NVD	↓	1	☑	☐	☐	☐	NA
65	16	1st Floor	Cafeteria - Storage Rm	26	Fittings	NVD	↓	1	☑	☐	☐	☐	NA
66	17	1st Floor	Cafeteria	27	2x4 Fissured Ceiling Tile	NVD	1,100 SF	1	☐	☑	☑	☐	C-NAD, C-NAD
67	18	1st Floor	Cafeteria	27	2x4 Fissured Ceiling Tile	NVD	↓	1	☐	☑	☑	☐	↓ ↓

Relinquished By & Company:	Eddy Monotya	Omega Environmental
Date & Time:	6-18-22	18:00 PM

Received By Company:	Jayanti Rao
Date & Time:	6/21/22
Analyzed By:	Yi Zong Zhao
Date & Time:	6/21/22/22

16 PLM 4 TEM/PLM NOB

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

22-06-118

Project # : 22-1181
page 6 of 6

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
68	19	1st Floor	Library	28	2x2 Soft Ceiling Tile	NVD	1,500 SF	1	☐	☑	☑	☐	C-NAD, C-NAD
69	20	1st Floor	Library	28	2x2 Soft Ceiling Tile	NVD	↓	1	☐	☑	☑	☐	↓ ↓

Relinquished By & Company:	Eddy Monotya [signature]	Omega Environmental	
Date & Time:	6-18-22	18:00 PM	

Received By Company:	[signature]
Date & Time:	6/21/22
Analyzed By:	[signature]
Date & Time:	6/21,22/22

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 96 S. Highland Ave.	**Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
70	A	CR	E	60		1st Floor, Cafeteria, Spray on Fireproofing - Fluffy	40.00	NAD							NAD
22-06-115-01	B	1	F					NVD							
	C	198.1	G												
	D		H												
71	A	CR	E	60		1st Floor, Cafeteria, Spray on Fireproofing - Fluffy	40.00	NAD							NAD
22-06-115-02	B	1	F					NVD							
	C	198.1	G												
	D		H												
72	A	CR	E	60		1st Floor, Cafeteria, Spray on Fireproofing - Fluffy	40.00	NAD							NAD
22-06-115-03	B	1	F					NVD							
	C	198.1	G												
	D		H												
73	A	R	E			1st Floor, Cafeteria, Fire Stop Caulk - Red				11.82	INC. NAD		NAD		NAD
22-06-115-04	B	1	F												
	C	198.4/6	G												
	D		H												
74	A	R	E			Basement, Electrical Room, Fire Stop Caulk - Red				15.82	INC. NAD		NAD		NAD
22-06-115-05	B	1	F												
	C	198.4/6	G												
	D		H												
75	A	BR	E			Basement, Electrical Room, Old Fiberglass Pipe Insulation - Wrap	0.00	NAD							NAD
22-06-115-06	B	1	F												
	C	198.1	G												
	D		H	100											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 96 S. Highland Ave.	**Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results	% All	% PLM NOB Results	% *TEM NOB Results	% TOTAL Asbestos
76	A	BR	E		Basement, Electrical Room, Old Fiberglass Pipe Insulation - Wrap	0.00	NAD				NAD
	B	1	F								
22-06-115-07	C	198.1	G								
	D		H	100							
77	A	BR	E		Basement, Electrical Room, Old Fiberglass Pipe Insulation - Wrap	0.00	NAD				NAD
	B	1	F								
22-06-115-08	C	198.1	G								
	D		H	100							
78	A	BR/S	E	15	Basement, Electrical Room, Fiberglass Duct Insulation - Wrap	55.00	NAD				NAD
	B	2	F								
22-06-115-09	C	198.1	G								
	D	30	H								
79	A	BR/S	E	15	Basement, Electrical Room, Fiberglass Duct Insulation - Wrap	55.00	NAD				NAD
	B	2	F								
22-06-115-10	C	198.1	G								
	D	30	H								
80	A	BR/S	E	15	Basement, Electrical Room, Fiberglass Duct Insulation - Wrap	55.00	NAD				NAD
	B	2	F								
22-06-115-11	C	198.1	G								
	D	30	H								
81	A	WH/S	E	5	1st Floor, Cafeteria, New Fiberglass Pipe Insulation - Wrap	35.00	NAD				NAD
	B	2	F								
22-06-115-12	C	198.1	G								
	D	60	H								

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 96 S. Highland Ave.	**Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
82	A	WH/S	E	5		1st Floor, Cafeteria, New Fiberglass Pipe Insulation - Wrap	35.00	NAD							NAD
22-06-115-13	B	2	F												
	C	198.1	G												
	D	60	H												
83	A	WH/S	E	5		1st Floor, Cafeteria, New Fiberglass Pipe Insulation - Wrap	35.00	NAD							NAD
22-06-115-14	B	2	F												
	C	198.1	G												
	D	60	H												
84	A	GR	E			Basement, Electrical Room, 1x2 Ceiling Tile				77.55	INC. NAD		NAD		NAD
22-06-115-15	B	1	F												
	C	198.4/6	G												
	D		H												
85	A	GR	E			Basement, Electrical Room, 1x2 Ceiling Tile				74.85	INC. NAD		NAD		NAD
22-06-115-16	B	1	F												
	C	198.4/6	G												
	D		H												
86	A	GR	E			Basement, Electrical Room, 2x4 Fissured Ceiling Tile				64.90	INC. NAD		NAD		NAD
22-06-115-17	B	1	F												
	C	198.4/6	G												
	D		H												
87	A	GR	E			1st Floor, Cafeteria, 2x4 Fissured Ceiling Tile				60.00	INC. NAD		NAD		NAD
22-06-115-18	B	1	F												
	C	198.4/6	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606	**Project:** 96 S. Highland Ave.	**Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis					Sample Description	% Non-Fibrous Material	% Friable Results		% All	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
88	A	BR	E			Basement, Electrical Room, Concrete Wall	100.00	NAD							NAD
	B	1	F												
22-06-115-19	C	198.1	G												
	D		H												
89	A	BR	E			Basement, Electrical Room, Concrete Wall	100.00	NAD							NAD
	B	1	F												
22-06-115-20	C	198.1	G												
	D		H												
90	A	BR	E			Basement, Electrical Room, Concrete Wall	100.00	NAD							NAD
	B	1	F												
22-06-115-21	C	198.1	G												
	D		H												
91	A	GR	E			Basement, Electrical Room, CMU	100.00	NAD							NAD
	B	1	F												
22-06-115-22	C	198.1	G												
	D		H												
92	A	GR	E			1st Floor, Cafeteria, CMU	100.00	NAD							NAD
	B	1	F												
22-06-115-23	C	198.1	G												
	D		H												
93	A	GR	E			Basement, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F												
22-06-115-24	C	198.1	G												
	D		H												

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 96 S. Highland Ave. **Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22

Client ID # Lab ID #	Stereomicroscope Analysis				Sample Description	% Non-Fibrous Material	% Friable Results		% AII	% PLM NOB Results		% *TEM NOB Results		% TOTAL Asbestos
94	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-115-25	C	198.1	G											
	D		H											
95	A	GR	E		1st Floor, Cafeteria, CMU - Mortar	100.00	NAD							NAD
	B	1	F											
22-06-115-26	C	198.1	G											
	D		H											

BULK ASBESTOS TEST REPORT

Client/Address: Omega Environmental/280 Huyler St., So. Hackensack, NJ 07606		**Project:** 96 S. Highland Ave.	**Proj#:** 22-1181
Laboratory ID: 22-06-115	**Date of Report:** 06/23/22	**Date of Analysis:** 06/21/22, 06/22/22	

PLM ANALYST	PLM-NOB ANALYST	TEM-NOB ANALYST	LABORATORY DIRECTOR
Y. Zhao	Y. Zhao		M. Young

LABORATORY ACCREDITATION NUMBERS: NYSDOH ELAP LAB ID 12005 and NVLAP Lab Code 600253-0

- *TEM-NOB was subcontracted and analysis was performed by Laboratory Testing Services Inc. at 45-09 Greenpoint Ave, LIC, NY 11104 ELAP ID # 10955, NVLAP Lab Code 101958, Director: Emanuel Dimitrakas
- Samples will be stored for sixty (60) days. LTS Inc. should be notified within this time frame for a true duplicate analysis.
- Above results relate only to samples submitted and analyzed. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any U.S. Government agency. Test reports may not be reproduced except in full and with prior approval of LTS Inc.
- ELAP 6.3.2.2. Polarized-light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- The liability of LTS Inc., with respect to the services charged, shall in no event exceed the amount of the invoice.
- Analytical Methodologies: ELAP Method 198.1, 198.6, EPA 600/M4-82-020, as found in 40 CFR, Part 763, App E to Subpart E, and EPA/600/R-93/116 (Point Count only).
- INC.: Inconclusive, NAD: No Asbestos Detected, NVD: No Vermiculite Detected, SAFP: Stop at First Positive
- CH: Chrysotile, AMOS: Amosite,TRE: Tremolite, ANTH: Anthophyllite, ACT: Actinolite, and CRO: Crocidolite.
- Stereomicroscopic Analysis: A: Color, B: Layers, C: Methodology, D: Cellulose, E: Fiberglass, F: Hair, G: Vermiculite, H: OTHER
- Color: BK: Black, BR: Brown, Dk BR: Dark Brown, Lt BR: Light Brown, R BR: Reddish Brown, GR: Gray, Dk GR: Dark Gray, Lt GR: Light Gray, BE: Beige, P: Pink, R: Red, T: Tan, WH: White, Off WH: Off White, Y: Yellow, BL: Blue, CR: Cream, GN: Green, O: Orange, Multi.: Multiple Colors

OMEGA ENVIRONMENTAL SERVICES, INC
280 Huyler Street South Hackensack, NJ 07606
T 201.489.8700 F 201.342.5412
website www.omega-env.com

22-06-115

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

email results to: lab@omega-env.com and eddym@omega-env.com

Project Name:	KG&D Architects Middle School
Project #	22-1181
Site Location:	96 S Highland Ave, Nyack Ny 10960
Sampled By:	Eddy Montoya 13-12147/153271
Date Sampled:	6-18-22 18:30 - 21:30

Turnaround Time Requested:	24 Hr TAT
Total # of Samples: 36 samples.	70 - 95 of 95
Analyze by each individual layer or as indicated	✓
Analyze all samples without 1st positive stop	☐
Stop after 1st positive for each homogeneous area	✓

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
70	1	1st Floor	Cafeteria	29	Spray On Fireproofing - Fluffy	NVD	780 SF	1	✓	☐	☐	☐	C-NAD
71	2	1st Floor	Cafeteria	29	Spray On Fireproofing - Fluffy	NVD		1	✓	☐	☐	☐	↓
72	3	1st Floor	Cafeteria	29	Spray On Fireproofing - Fluffy	NVD		1	✓	☐	☐	☐	↓
73	4	1st Floor	Cafeteria	30	Fire Stop Caulk - Red	NVD	2 SF	1	☐	✓	✓	☐	C-NAD, C-NAD
74	5	Bsmt	Electrical Room	30	Fire Stop Caulk - Red	NVD	3 SF	1	☐	✓	✓	☐	↓ ↓
75	6	Bsmt	Electrical Room	31	old Fiberglass Pipe Insulation - Wrap	NVD	20 Ln FT	1	✓	☐	☐	☐	C-NAD
76	7	Bsmt	Electrical Room	31	old Fiberglass Pipe Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
77	8	Bsmt	Electrical Room	31	old Fiberglass Pipe Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
78	9	Bsmt	Electrical Room	32	Fiberglass Duct Insulation - Wrap	NVD	80 SF	1	✓	☐	☐	☐	C-NAD
79	10	Bsmt	Electrical Room	32	Fiberglass Duct Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
80	11	Bsmt	Electrical Room	32	Fiberglass Duct Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
81	12	1st Floor	Cafeteria	33	New Fiberglass Pipe Insulation - Wrap	NVD	120 Ln Ft	1	✓	☐	☐	☐	C-NAD
82	13	1st Floor	Cafeteria	33	New Fiberglass Pipe Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
83	14	1st Floor	Cafeteria	33	New Fiberglass Pipe Insulation - Wrap	NVD		1	✓	☐	☐	☐	↓
84	15	Bsmt	Electrical Room	34	1x2 Ceiling Tile	Damaged	350 Sf	1	☐	✓	✓	☐	C-NAD, C-NAD
85	16	Bsmt	Electrical Room	34	1x2 Ceiling Tile	Damaged		1	☐	✓	✓	☐	↓ ↓
86	17	Bsmt	Electrical Room	35	2x4 Fissured Ceiling Tile	NVD	350 SF	1	☐	✓	✓	☐	
87	18	1st Floor	Cafeteria	35	2x4 Fissured Ceiling Tile	NVD	1,100 SF	1	☐	✓	✓	☐	

Relinquished By & Company:	Eddy Montoya	Omega Environmental
Date & Time:	6-18-22	21:30PM

Received By Company:	1552 Yu Ting Zhao 6/21/22
Date & Time:	

Analyzed By:	Yu Ting Zhao
Date & Time:	6/21/22/22

20 plm 6 TEM/plm NOB

OMEGA ENVIRONMENTAL SERVICES, INC

280 Huyler Street South Hackensack, NJ 07606
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22-06-115

Project #: 22-1181
page 8 of 8

CHAIN OF CUSTODY/ANALYSIS REQUEST FOR ASBESTOS BULK SAMPLES

Sample #	Lab ID #	Floor/ Level	Location (Room, Area, etc)	HA#	Description of Homogeneous Material (type, color, size, etc)	General Condition	Quantity	Estimated # of layers	Analysis Requested: PLM	PLM-NOB	TEM-NOB	Other Analysis	Notes and Comments
88	19	Bsmt	Electrical Room	36	concrete Wall	NVD	80 SF	1	☑	☐	☐	☐	(-)NAD
89	20	Bsmt	Electrical Room	36	concrete Wall	NVD	)	1	☑	☐	☐	☐	↓
90	21	Bsmt	Electrical Room	36	concrete Wall	NVD	↓	1	☑	☐	☐	☐	↓
91	22	Bsmt	Electrical Room	37	CMU	NVD	60 SF	1	☑	☐	☐	☐	(-)NAD
92	23	1st Floor	Cafeteria	37	CMU	NVD	800 SF	1	☑	☐	☐	☐	↓
93	24	Bsmt	Cafeteria	38	CMU - Mortar	NVD	60 Sf	1	☑	☐	☐	☐	(-)NAD
94	25	1st Floor	Cafeteria	38	CMU - Mortar	NVD	800 SF	1	☑	☐	☐	☐	↓
95	26	1st Floor	Cafeteria	38	CMU - Mortar	NVD	↓	1	☑	☐	☐	☐	↓
									☐	☐	☐	☐	
									☐	☐	☐	☐	
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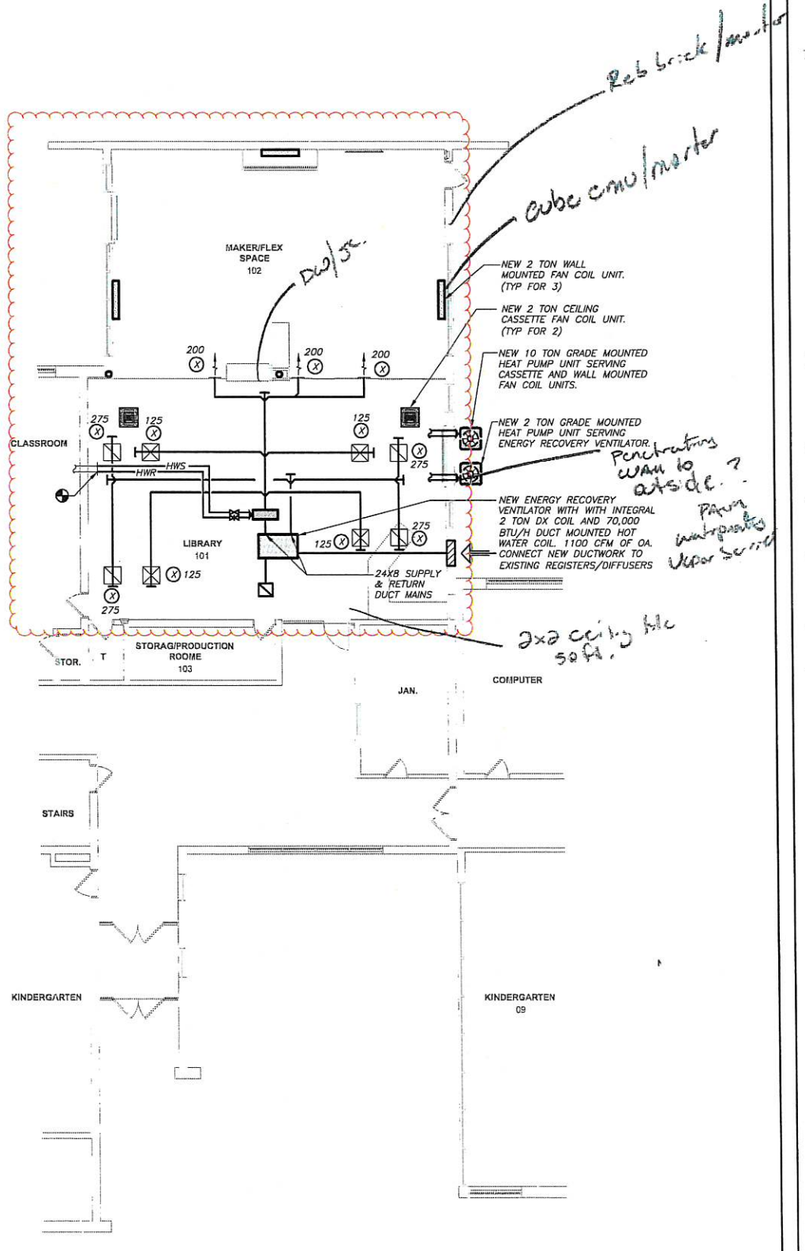
									☐	☐	☐	☐	
									☐	☐	☐	☐	
									☐	☐	☐	☐	

Relinquished By & Company:	Eddy Montoya [signature]	Omega Environmental
Date & Time:	6-18-22	21:30PM

Received By Company:	LTS2 Yu Fang Zhao 6/21/22
Date & Time:	

Analyzed By:	Yu Fang Zhao
Date & Time:	6/21,22/22

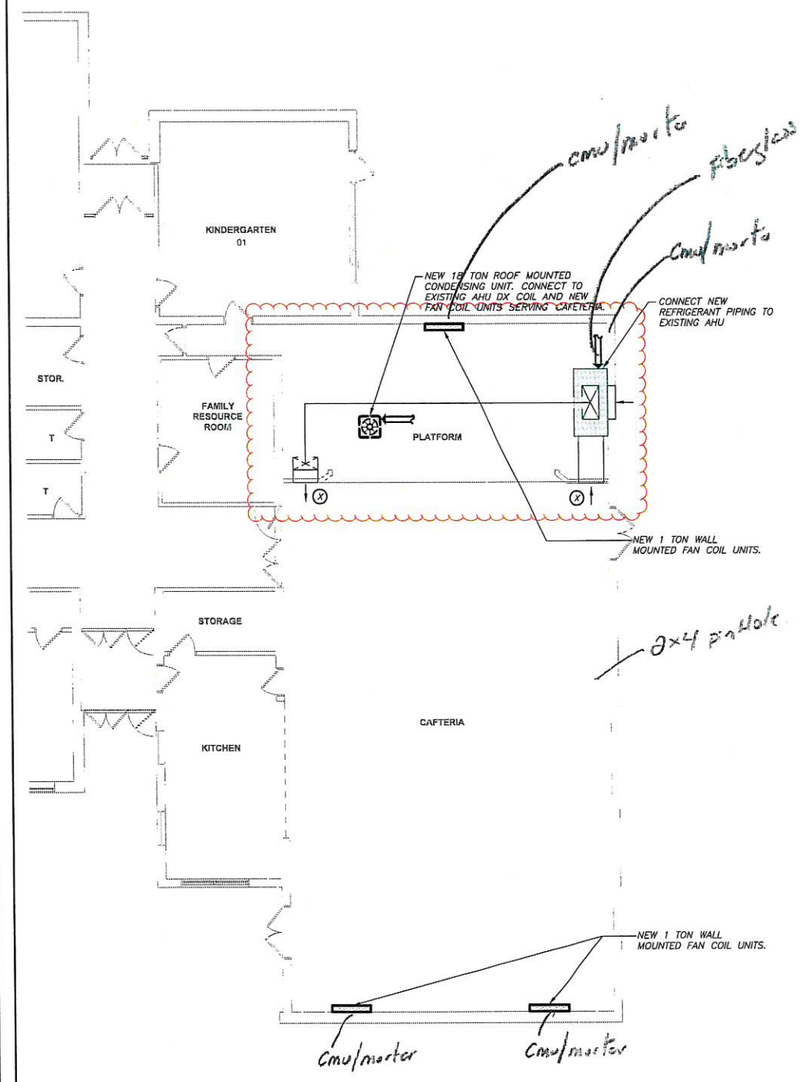


PART FIRST FLOOR PLAN (NEW WORK)

2 / H204

0 8' 16'

1/8 inch=1 foot



PART FIRST FLOOR PLAN (NEW WORK)

1 / H204

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

DISTRICT WIDE AIR CONDITIONING WORK

UPPER NYACK ES
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NYACK, NEW YORK 10989

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NY SED PROJECT CONTROL NO.
MS: 50-03-04-03-0-004-020
LIBERTY : 50-03-04-03-0-006-016
VALLEY COTTAGE: 50-03-04-03-0-001-016
UPPER NYACK : 50-03-04-03-0-007-023

CONSTRUCTION DOCUMENTS

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CONSULTING ENGINEERS
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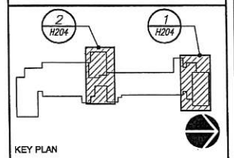


KEY PLAN

Professional Seal

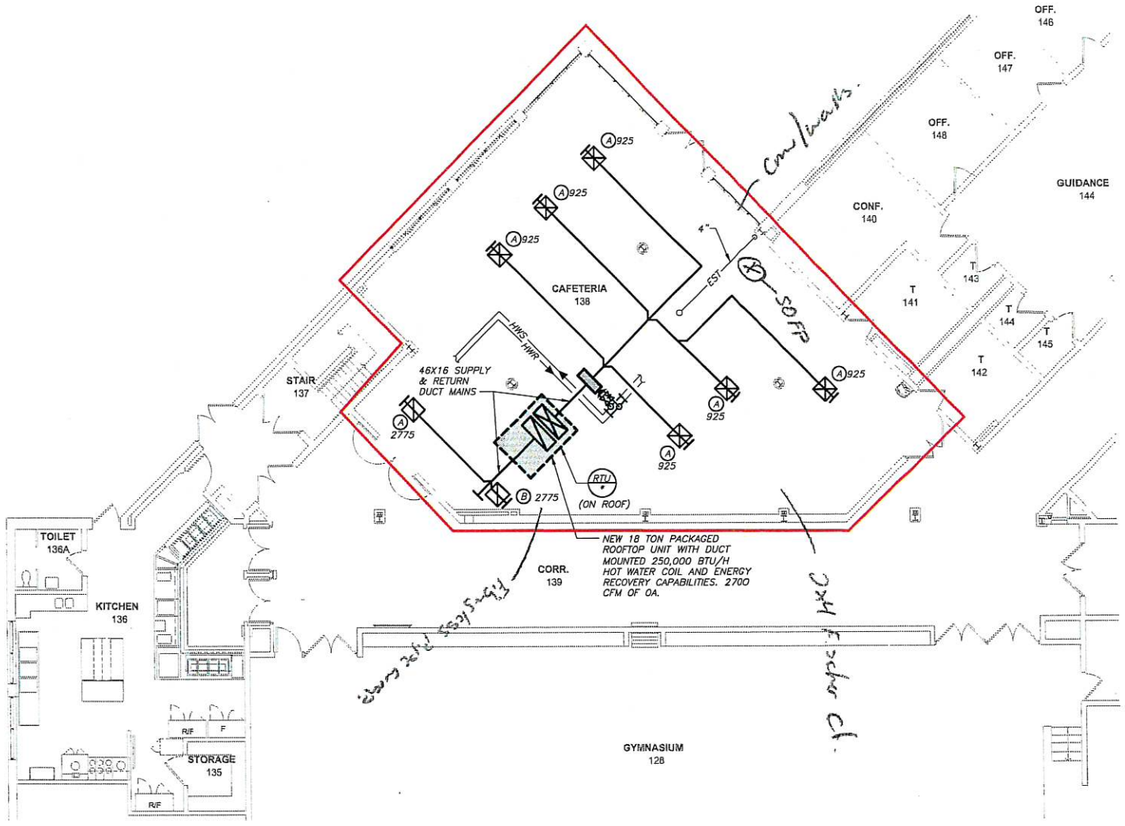
No.	Date	Issue
1	4/08/2022	SCHEMATIC DESIGN

Sheet Title
UPPER NYACK ES
PART FIRST FLOOR PLANS
(NEW WORK)

Job No.	Date
2021-1055	04/08/2022
Scale: AS NOTED	Drawn / Checked: BGA/BGA

Sheet Number
H204

DBE: TAB: Layout1 – Y:\NYACK PUBLIC SCHOOLS\Nyack Schools – DW AC – Libraries & Cafes (2215.00)\Drawings\HVAC\122500H204.dwg – DATE: Apr 08, 2022 – 4:21pm



PART FIRST FLOOR PLAN (NEW WORK)

1 / H202

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

DISTRICT WIDE AIR CONDITIONING WORK

NYACK MIDDLE SCHOOL CAFETERIA

96 S HIGHLAND AVE, NYACK, NY 10960

KG+D listen imagine build

KG+D , ARCHITECTS PC

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NY SED PROJECT CONTROL NO.

MS: 50-03-04-03-0-004-020
LIBERTY : 50-03-04-03-0-008-016
VALLEY COTTAGE: 50-03-04-03-0-001-016
UPPER NYACK : 50-03-04-03-0-007-023

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CONSULTING ENGINEERS

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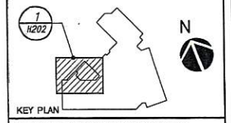


Professional Seal

No.	Date	Issue
1	4/08/2022	SCHEMATIC DESIGN

Sheet Title

MIDDLE SCHOOL PART FIRST FLOOR PLAN (NEW WORK)

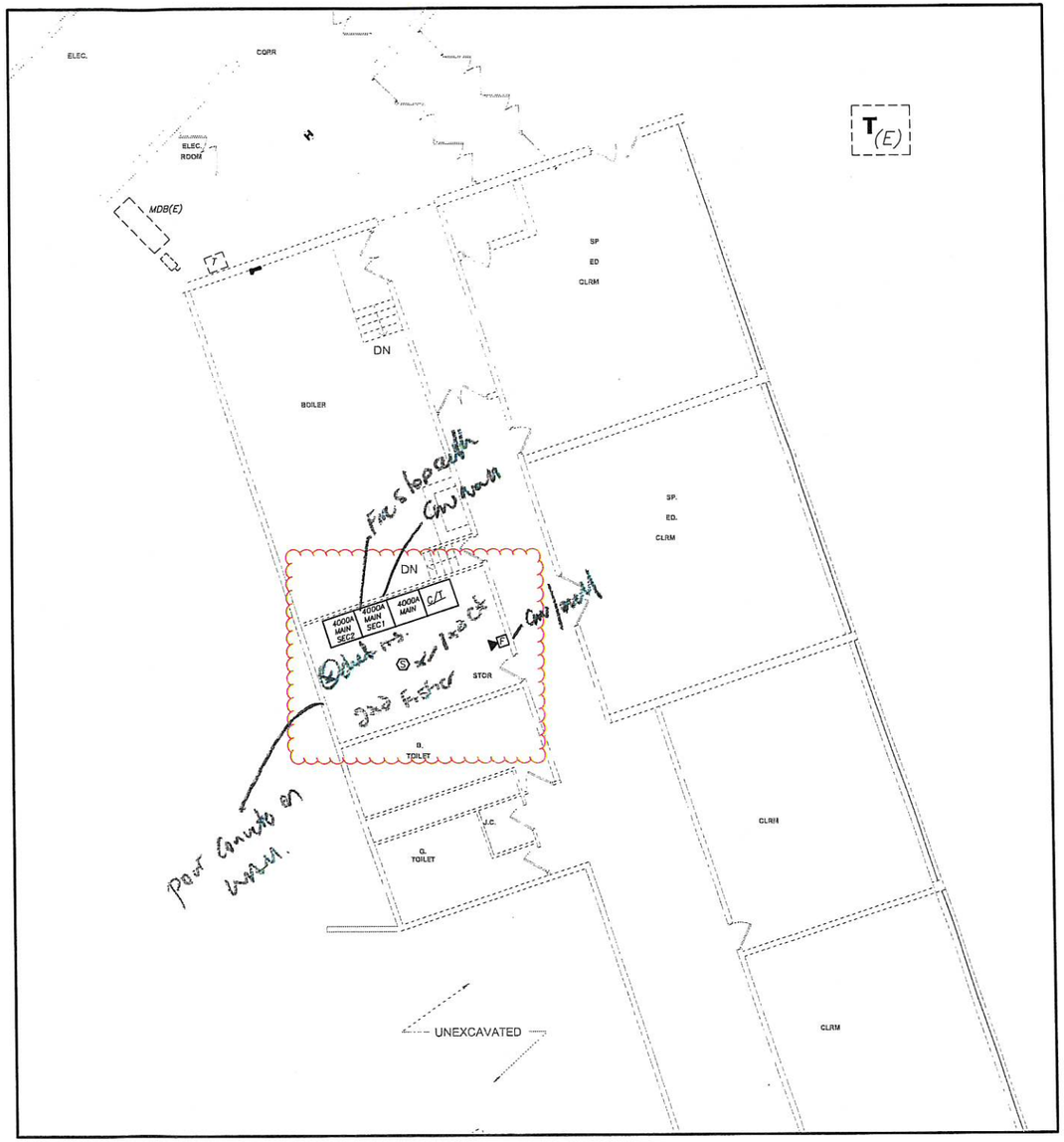
Job No.	Date
2021-1055	04/08/2022
Scale: AS NOTED	Drawn / Checked: BGA/BGA

Sheet Number

H202

ELECTRICAL SD SCOPE NOTES:

1. *PROVIDE NEW 4000AMP 120/208V MAIN SWITCHBOARD. ALL WORK TO BE COORDINATED WITH UTILITY COMPANY. BACK FEED EXISTING MDB FROM THE NEW SWITCHBOARD*



LIBERTY SITE PLAN (1 / E301)
(NEW WORK)

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

DISTRICT WIDE AIR CONDITIONING WORK

NYACK MIDDLE SCHOOL CAFETERIA

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MS: 50-03-04-03-0-004-020
LIBERTY : 50-03-04-03-0-005-016
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UPPER NYACK : 50-03-04-03-0-007-023

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KEY PLAN

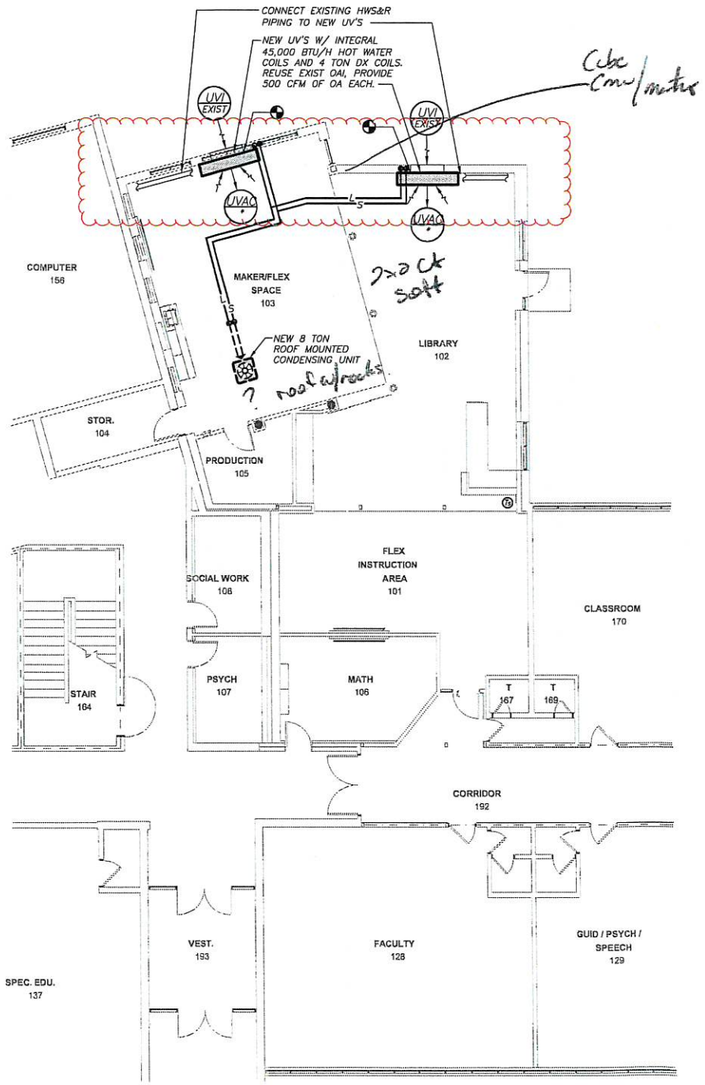
Professional Seal

No.	Date	Issue
1	4/08/2022	SCHEMATIC DESIGN

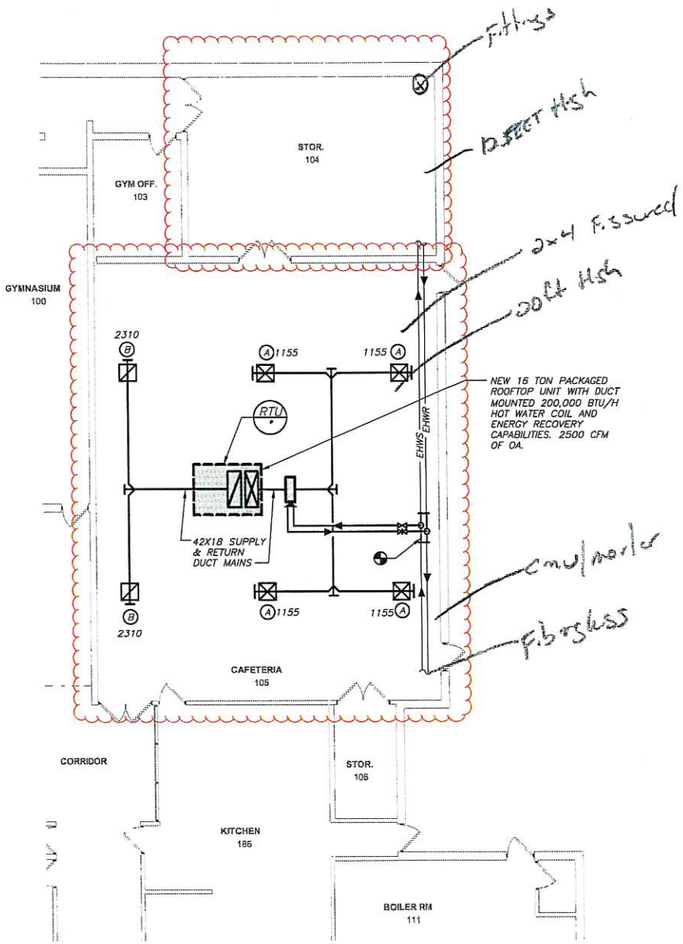
Sheet Title
MIDDLE SCHOOL ELECTRIC SERVICE PLAN

Job No.	Data
2021-1055	04/08/2022
Scale: AS NOTED	Drawn / Checked: BGA/BGA

Sheet Number
E302



PART FIRST FLOOR PLAN (NEW WORK) 2 H201 1/8 inch=1 foot



PART FIRST FLOOR PLAN (NEW WORK) 1 H201 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

DISTRICT WIDE AIR CONDITIONING WORK

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NY SED PROJECT CONTROL NO.
MS: 50-03-04-03-0-004-020
LIBERTY : 50-03-04-03-0-006-016
VALLEY COTTAGE: 50-03-04-03-0-001-016
UPPER NYACK : 50-03-04-03-0-007-023

CONSTRUCTION DOCUMENTS

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KEY PLAN

Professional Seal

No.	Date	Issue
1	4/08/2022	SCHEMATIC DESIGN

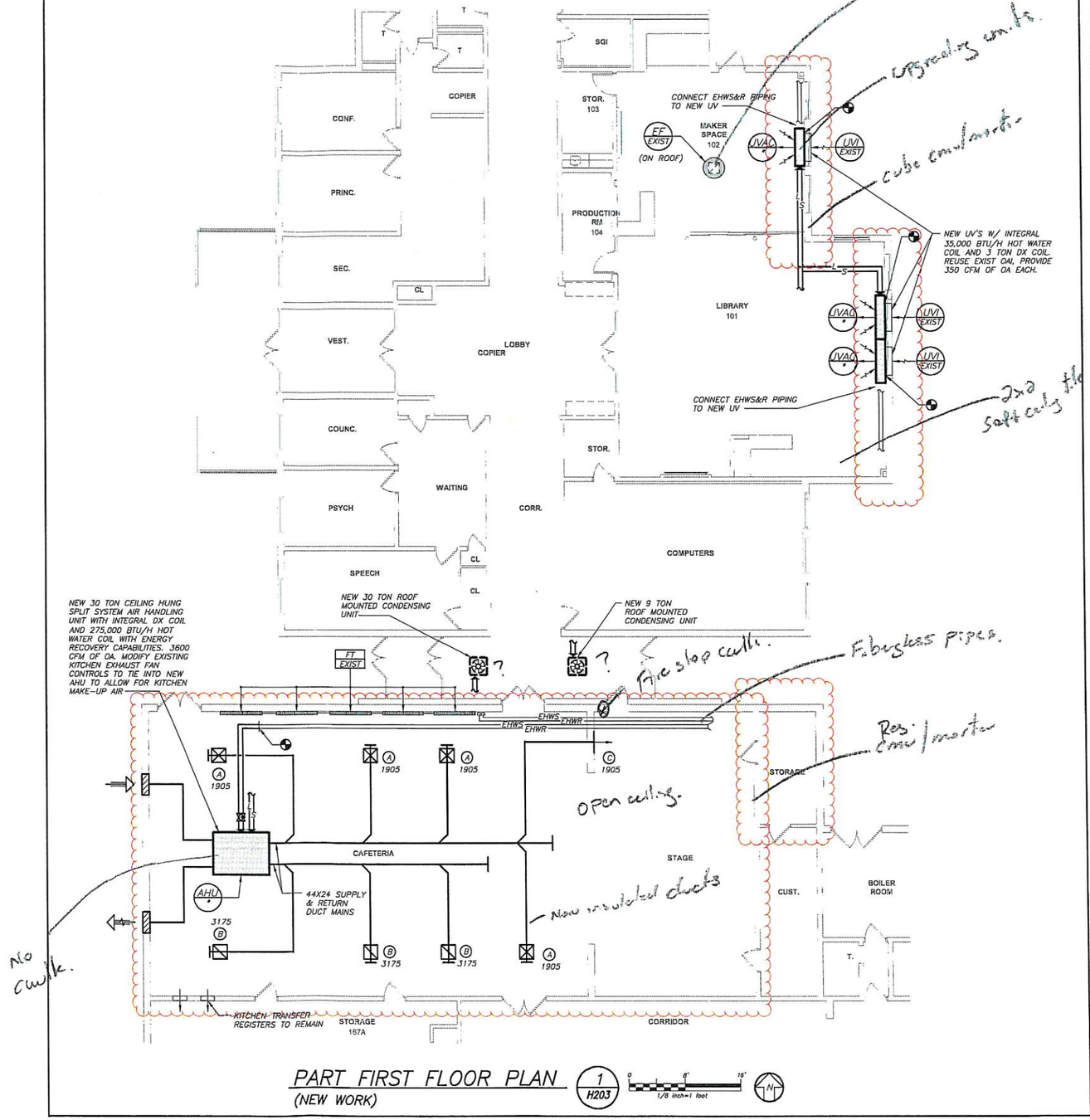
Sheet Title

LIBERTY ES PART FIRST FLOOR PLANS (NEW WORK)

Job No.	Date
2021-1055	04/08/2022
Scale: AS NOTED	Drawn / Checked: BGA/BGA

Sheet Number

H201



PART FIRST FLOOR PLAN (NEW WORK)

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

DISTRICT WIDE AIR CONDITIONING WORK

VALLEY COTTAGE ES
CAFETERIA & LIBRARY

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VALLEY COTTAGE, NEW YORK 10989

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NY SED PROJECT CONTROL NO.
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KEY PLAN

Professional Seal

No.	Date	Issue
1	4/08/2022	SCHEMATIC DESIGN

Sheet Title

VALLEY COTTAGE ES
PART FIRST FLOOR PLAN

Job No.	Date
2021-1055	04/08/2022
Scale: AS NOTED	Drawn / Checked: BGA/BGA

Sheet Number

H203

SECTION 033000 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of the concrete, forms, reinforcing and finishing work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

1. Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting devices.
2. Erect and remove all form work required to properly complete the work.
3. Finish all concrete work as hereinafter specified.
4. Cure and protect all concrete and cement work.
5. Provide floor sealers and dustproofing of all areas exposed without applied finish.
6. Perform all cutting, patching, grouting, repairing and pointing up as required in connection with both new and altered work. Coordinate with Section 02 41 19.
7. Provide non-shrink grout at pockets in concrete slabs, and at other locations as applicable.
8. Perform all other work and materials as may be reasonably inferred and needed to make the work of this Section complete.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification with specific reference to those sections noted above and as follows:

A. Divisions 21 through 28 for sleeves and penetration requirements and coordination drawings.

1.4 QUALITY ASSURANCE

A. Unless specifically specified otherwise herein or by local ordinance, accomplish all work in accordance with the following codes, standards and specifications, and such requirements shall be binding as if specified directly herein. Only the latest editions (at bid date) of the following codes, standards and specifications shall form part of this Specification to the extent indicated by the reference thereto.

B. The work of this section shall further conform to the Codes, Rules and Regulations of the State of New York as promulgated within the New York State Uniform Fire Prevention and Building Code.

C. The work of this Section shall conform to all requirements of ACI 301-05, "Specifications for Structural Concrete for Buildings" and ACI 318-02, “Building

Code Regulations for Structural Concrete". Although the remainder of this Section states, in condensed form, the pertinent provisions of that document, it shall be understood that it has been adopted in its entirety and may be referred to throughout the project for provisions not restated below.

D. Concrete floor and slab construction shall conform to the recommendations of ACI 302.1, "Guide for Concrete Floor and Slab Construction".

E. The standards of the American Society for Testing and Material and the American Concrete Institute, referred to in these specifications by their serial designation are declared to be a part of these specifications, the same as if fully set forth herein.

F. Ready mix plant equipment and facilities shall conform to the "Check List for Certification of Ready Mixed Concrete Production Facilities" of the National Ready Mixed Concrete Association.

G. The Contractor shall conform to requirements of the above codes and standards unless specified otherwise in this Section. In case of apparent conflict between standards or between standards and the Specifications hereinafter, the more restrictive requirement shall apply.

H. The ACI Field Reference Manual, SP-15 shall be kept at the job site, and the practices set forth therein, shall be strictly adhered to.

I. Coordinate with testing and quality control requirements set forth in Section 01 43 26 and further:

1. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
    a. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
    b. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

J. The Contractor shall conform to requirements of the above codes and standards unless specified otherwise hereinbelow. In case of apparent conflict between standards or between standards and the Specifications hereinbelow, the more restrictive requirement shall apply.

K. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete FlatworkTechnician.

L. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment and certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.5 SUBMITTALS - Coordinate with Section 013300

- Submittals shall be made in groupings where installations are complementary, i.e. steel, steel decking, steel stairs, stair railings; roof systems/flashings; mechanical and electrical apparatus and the like. Failure to comply with this requirement will be cause for rejection of any or all submittals.
- As set forth in Sections 01 33 00 and 01 32 00, prepare and submit a fully developed submittal schedule; note review times set forth in Section 01 33 00 are deemed "average", for large submissions allow longer review times.
- Attention is directed to Section 01 31 14 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".
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect.

B. Shop Drawings: shop and erection drawings shall be prepared only by competent detailers, checked prior to submission.

1. Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing:
   a. bar schedules
   b. elevations of top and bottom of concrete and shelves and block-out;
   c. dimensions of concrete work with specified reinforcement clearances
   d. ledges, brackets, openings, sleeves or other items furnished by other Sections where interference with reinforcement may occur
   e. bending diagrams
   f. assembly diagrams
   g. splices and laps of reinforcement
   h. temperature and shrinkage reinforcement
   i. construction joint reinforcement
   j. shapes, dimensions, grade designations, and details of reinforcement and accessories

   NOTE: Show dowels with concrete work to be placed first. Make coordinated drawings showing size and location of openings and sleeves and incorporate this information on the reinforcing drawings. Reference Section 01 43 26.

C. Except as otherwise noted, approval of Shop Drawings will be for size and

arrangement of components. Errors in dimensions shown on Shop Drawings shall be the responsibility of Contractor. Check and coordinate concrete work with work of other trades before submitting Shop Drawings.

D. Do not proceed with fabrication of material or performance of work until corresponding item on Shop Drawing has been approved in writing by the Architect.

E. Submit samples of materials as requested by Architect, including names, sources and descriptions.

F. Certification of Specification Compliance.

G. Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

H. Submit laboratory test reports for concrete materials and mix design test.

I. Mill Test Certification: Submit prior to delivery of reinforcing steel or concrete to job site, certified mill test reports of reinforcing steel and cement, (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this project. When material is scheduled to be galvanized, submit certification from galvanizer as to weights and properties applicable to same.

J. Material Safety Data Sheet (MSDS) must be submitted for each product.

NOTE: Maintain at least one copy of each final shop drawing available in the Contractors' field office. Drawings not bearing evidence of **approval or release** for construction by the Architect shall not be kept on the job.

K. Outline of procedures, materials to be incorporated and curing techniques for patching of existing concrete surfaces at tie-ins of new construction to existing.

L. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING (Coordinate with Section 01 61 00)

A. Reinforcement according to released Shop Drawing shall be delivered to the job site at such time as it is required by the program of operations. Reinforcement and metal accessories shall have each rod or bundle identified by metal tag showing size and location in accordance with setting plans and shall be stored off the ground, protected from deterioration by weather, dirt and construction operations.

B. Forms of fiberglass or of steel are to be stored out of contact with the ground, and with such protection as prevents rust, change of shape and other damage.

C. Store and protect all other materials strictly in accordance with the Manufacturer's instruction. Particular attention is called to the maintenance of correct temperatures to prevent the deterioration of certain products. Any materials not so stored will be subject to rejection by the Architect.

1.7 SUBSTITUTIONS (Coordinate with Section 01 25 00)

A. Substitutions for member sizes, type(s) of concrete, connection details or any other modifications proposed by Contractor will be considered by Architect only under following conditions:
   1. That request has been made and accepted prior to submission of Shop Drawings
   2. That there is a substantial cost advantage or time advantage to the Owner; or that proposed revision is necessary to obtain required materials or methods at proper times to accomplish work in time scheduled
   3. That sufficient sketches, engineering calculations, and other data have been submitted to facilitate checking by Architect, including cost reductions or savings in time to complete work
   4. That the cost of reviewing the substitutions shall be borne entirely by the Contractor.

1.8 TESTING AND INSPECTION

A. An organization, approved by the Architect, shall be retained by the Owner for testing, inspection and control of the concrete at the batching plant and in the field. The Contractor shall accept test results from this organization as final.

B. Testing, inspection and control shall be performed by the Owner's testing organization as directed by the Architect and in accordance with requirements set forth in Section 01 43 26. The testing services listed in ACI Standard 301 shall be the minimum required as well as required conformance to the requirements of **Chapter 17 of the building code of the jurisdiction of the Work** are complied with and will provide and/or supervise inspection and testing requirements, as necessary.
   1. Maintain on site representation to the extent necessary to perform the following:
      a. Review the Contractors proposed materials for compliance with the specifications as requested by the Owner.
      b. Review the proposed design mixes.
   2. Conduct strength tests in accordance with the following procedures: (A strength test consists of 4 concrete cylinders.)
      a. Secure composite samples in accordance with ASTM C 172. Each test shall be obtained from a different batch of concrete on a representative, truly random basis. When pumping or pneumatic placing equipment is used, samples shall be taken from discharge end.
      b. Mold 4 specimens from each sample in accordance with requirements of ASTM C 31 and cure same in accordance with Division 7(a) and (b) of said method.
      c. Test 3 specimens; 1 at 7 days and 2 at 28 days in accordance with ASTM C 39. The 28 day test result shall be the average of the 2 strengths of the 2 specimens. If the average of the 2 specimens is less than the required strength, test the 4th at 45 days.
      d. Make 1 strength test for each 50 cu.yds. or fraction thereof from each design mix of concrete placed in any one day; except that in

no case shall a given mix design be represented by less than five tests.

3. Prepare additional cylinders as required by the contractor for determination of concrete strengths required for removal of shoring.
4. Determine slump of concrete sample for each strength test and whenever consistency of concrete appears to vary in accordance with ASTM C 143.
5. Determine air content of concrete sample for each strength test in accordance with either ASTM C 231, C 173 or C 138.
6. Determine temperature of concrete for each strength test.
7. Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests. Submit all test reports indicating nonconformance to the specifications on colored paper.
8. Nondestructive Testing: Windsor probes, sonoscope, or other nondestructive device as may be **approved for use by the Engineer of Record** but shall not be used as the sole basis for acceptance or rejection.
9. Additional Tests: The testing service will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.
10. Maintain continuous liaison with the Architect/Engineer, alerting him immediately of conditions that adversely affect the performance of the work.

1.9 CONSTRUCTION PROCEDURES

A. Forms, bracings, construction procedures, erection methods, equipment, and safety requirements are outside the scope of this specification and are solely the responsibility of this Contractor. Periodic visits to the site by the inspector or engineer, including the approval of design aspects, are not to be interpreted as approval of these activities, and in no way relieve the Contractor of this responsibility.

B. If faulty construction procedures or material result in defective work that requires additional engineering time to devise corrective measures, professional fees for such work may be charged to the Contractor at the standard hourly rate for extra work. Such fees may be withheld from the Contractor's payment.

1.10 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the

entire project, preference will be given to those with the following characteristics:

1. Water based
2. Water-soluble
3. Can be cleaned up with water
4. Non-flammable
5. Biodegradable
6. Low or preferably no Volatile Organic Compound (VOC) content
7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere
8. Manufactured without compounds that contribute to smog in the lower atmosphere
9. Do not contain methylene-chloride
10. Do not contain chlorinated hydrocarbons
11. Contains the least possible of post-consumer or post-industrial waste

PART 2 - PRODUCTS

2.1 CONCRETE CONSTITUENTS

A. Cement: American made Portland Cement, free from water soluble salts or alkalies which will cause efflorescence on exposed surfaces. Unless otherwise noted on the drawings, Portland Cement shall be Type I or II, each conforming to ASTM C 150.

DEFINITION: Cementitious Materials - Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

Use only one brand of cement for each type of cement throughout project. Contractor shall be responsible for whatever steps are necessary to ensure that no visual variations in color will result in exposed concrete and shall place on order and secure in advance a sufficient quantity of this (these) cement(s) to complete concrete work specified herein.

B. Fly-Ash: ASTM C 618, Type C or Type F.

C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Architect.

Maximum designated sizes for normalweight coarse aggregate to be used in concrete sections shall be as noted below, except that sizes shall also be chosen in conjunction with required clearances.

1. Aggregates larger than 3/4 inch may not be used except for foundation elements, where 1-1/2 inch aggregate may be used in work below finished

grade provided the size of the coarse aggregate does not exceed 3/4 of the clear distance between the reinforcing bars, nor the clear distance between the reinforcement and the face of the concrete member in which it is placed.

2. For column or wall elements with minimum dimension ≤ 8 inches, use pea stone (3/8 inch) gravel maximum.
3. For all other concrete, maximum aggregate size shall be 3/4 inch
4. For mat concrete, coarse aggregate size shall be as large as possible consistent with placement limitations and clearances but shall not exceed 3 inches.

D. Water shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

E. Admixtures

1. Water reducing agents for general project use and required for concrete flatwork exposed to weather as specified in Section "Pavements and Surfaces" shall be one of the following:
   a. "Sikament 300" or "Plastocrete 161" by Sika Corporation
   b. "WRDA Hycol" by Grace Construction Products
   c. "Pozzolith 200N" by BASF Construction Chemicals – Building Systems
   d. "PDA25" by Protex Industries
   e. "Eucon WR-75 or WR-89" by Euclid Chemical Co.

   each conforming to ASTM C 494, Type A for interior work; Type F for exterior work.
2. Air entrainment agents:
   a. "Darex AEA" or "Daravair" by Grace
   b. "MB-WR" or "MB-AE" by BASF Construction Chemicals – Building Systems
   c. "PROTEX AEA" by Protex
   d. "Air-Mix" by Euclid Chemical Co.
   e. "Sika AER" or Sika AEA-15" by Sika Corp.

   or approved equal conforming to ASTM C 260.
3. High-Range Water-Reducing Admixtures (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
   a. "Sikament 300 or Sikament 86" by Sika Corp.
   b. "Eucon 37" by Euclid Chemical Co.
   c. "Daracem-100" by Grace
   d. "Rheobuild 1000" by BASF Construction Chemicals – Building Systems
4. Water Reducing, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C 494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures.

a. "Accelguard 80" by Euclid Chemical Co.
b. "Daraset" by Grace
c. "Plastocrete 161 FL" by Sika Corp.

5. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain no more than 0.05 percent chloride ions.
   a. "Pozzolith Retarder" by BASF Construction Chemicals – Building Systems
   b. "Eucon Retarder 75" by Euclid Chemical Co.
   c. "Daratard" by Grace
   d. "Plastiment" by Sika Co.
6. Admixtures such as calcium chloride, thyocyanates or other such materials containing more than 0.05 percent chloride ions are not permitted.
7. Certification: Written conformance to the above mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Engineer; coordinate with Article 1.05 herein.

2.2 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, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
B. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
C. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

2.3 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Refer to General Notes of structural drawings for specific mixture/strength requirements
B. Topping Slabs: Proportion structural lightweight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Calculated Equilibrium Unit Weight: 110 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
   3. Maximum water - cement ratio as for 2.03.A.2 above.
   4. Slump Limit: 4 inches, plus or minus 1 inch.
   5. Air Content: 6 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size greater than 3/8 inch.
   6. Air Content: 7 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch or less.
   7. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.4 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced and amount of water withheld from total volume of water in approved mix design.

C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce maximum mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce maximum mixing and delivery time to 60 minutes or as established in ACI Hot Weather Standards.

D. No water shall be added after mixing to concrete containing HRWR (superplasticizer). If loss of slump occurs, HRWR may be redosed at the site as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Engineer and the manufacturer at the Pre-Concrete Conference as required in Part 1 of this Section.

2.5 REINFORCEMENT AND ACCESSORIES

A. Reinforcing Steel Bars: Newly rolled deformed billet steel conforming to ASTM A 615, Grade 60 (unless otherwise indicated on the drawings). Bars shall be bent cold.

B. Weldable reinforcing bars: A706/A706M-05a Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

C. Welded Wire Fabric: ASTM A 185 and supplied in sheets only, **rolls not permitted**.

D. Reinforcement Accessories: Conform to Product Standard PS7-766, Class C, as manufactured by Superior Concrete Accessories, Inc.; Dayton Sure-Grip Co.; R.K.L. Building Specialties Co., Inc; or approved equal. Reinforcement accessories shall include spacers, chairs, ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement. Tie wire shall be galvanized or stainless wire of sufficient strength for intended purpose, but not less than No. 18 gauge. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete. **Tie wires shall be cut in such a manner that no loose ends be produced that fall into the formwork.** Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.

2.6 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.7 MISCELLANEOUS MATERIALS

A. Grout - ready to use nonmetallic non shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C 1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4 foot square base plate.
   1. "Euco-NS" by Euclid Chemical Co.
   2. "Five Star Grout" by U.S. Grout Corp.
   3. "Masterflow 713" by BASF Construction Chemicals – Building Systems
   4. "SikaGrout 212" by Sika Corporation
   5. "Sonogrout 10K" by Sonneborn
   6. "Supreme" by Cormix Construction Chemicals

   or approved equal.

D. Curing Mediums:
   1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
   2. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
      a. Waterproof paper.
      b. Polyethylene film.
      c. Polyethylene-coated burlap.

E. Chemical Hardener - Sonneborn Division, BASF Construction Chemicals – Building Systems or approved equal.

F. Expansion Joint Fillers - ASTM D 1751 with an expansion board cap similar and equal to that manufactured/distributed by “BoMetals, Inc." to allow for sealant bead of Type IA material as specified Section 07 90 00 and accomplished as part of the work therein. Coordinate with Part 3 herein.

G. Shake-On Hardeners:
   1. Abrasive Material/Non-slip Aggregate: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials. Materials shall be similar and equal to:
      a. “A-H Emery Non-Slip” by Anti-Hydro
      b. “Grip-It” by L&M Construction Chemicals
      c. “Florundum” by Speccon, Inc.

H. Sleeves: approved metal and fiber containers, the fiber wall of the sleeves to be removed before setting standards. Coordinate with Divisions 21 through 28 inclusive.

I. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

O. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.

P. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

Q. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 REPAIR MATERIALS – Coordinate with Section 03 54 00

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 C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
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 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: 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 C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping 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 topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

PART 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 HANDLING, STORAGE AND PROTECTION OF MATERIALS

A. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those

containing ice. Remove improper and rejected materials immediately from point of use. Cover materials, including steel reinforcement and accessories, during construction period. Stockpile concrete constituents properly to assure uniformity throughout project.

3.3 PLACING OF REINFORCEMENT

A. Place reinforcement in accordance with reference standards set forth in 1.04 above and with further requirements below.

B. Reinforcement shall be accurately placed in accordance with Contract Documents and be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by Architect.

C. Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by Architect.

D. Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.

E. Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved by Architect. Splices of reinforcement at points of maximum stress shall generally be avoided. Welded wire fabric shall lap 6 inches or one space plus 2 inches whichever is larger, and shall be wired together.

F. Protect stored materials so as not to bend or distort prior to concrete placement, reinforcement shall be free of loose or excessive rust, scale, or other coatings that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to end or distort bars in any way. Bars that become damaged will be rejected.

G. Before concrete is cast, check all reinforcement after it is placed to insure that reinforcement conforms to Contract Documents and approved Shop Drawings. Such checking shall be done only by qualified experienced personnel. In addition, the Architect shall be notified at least 48 hours prior to concrete placement and given opportunity to inspect completed reinforcement and formwork before concrete placement. **Prior approval of Shop Drawings shall in no way limit Architect's right to demand modifications or additions to reinforcement or accessories.**

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.5 INSTALLATION OF EMBEDDED ITEMS

A. The Drawings will, in general, indicate work of other trades for which holes, sleeves, slots, recesses, etc., will be required, but the Contractor shall obtain the necessary information as to their exact location and cooperate with the interested trades so that they may be incorporated into the work.

B. Conform to requirements of ACI 318, paragraph 6.3, "Conduits and Pipes Embedded in Concrete", and as specified below.

C. The Contractor shall provide for the installation of reglets, inserts, hangers, metal ties, anchor bolts for steel columns and beams, dowels, thimbles, slots, nailing strips, blocking grounds and other fastening devices required for attachment of all work. They shall be properly located in cooperation with other trades and shall be secured in position before concrete is placed; the location of sleeves shall be subject to the approval of the Architect/Engineer.

D. In concrete walls, columns, and spandrel beams, shown to be faced with brick, block or other masonry, furnish and install in continuous vertical lines metal dovetail slot inserts at a spacing of 16 inches on center. Where columns or piers are faced with masonry, there shall be at least two such slots in any one face and where masonry walls abut columns or piers at least one such slot shall be provided.

E. Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast in place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

F. Install reglets to receive to top edge of foundation sheet waterproofing, and to receive through wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

G. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike off templates or accepted compacting type screeds.

H. Contractor shall coordinate this work with the other phases of the construction, and afford all cooperation and access to the setting of sleeves for such piping as may pass through the foundation work. Plug all sleeves and openings of whatever nature installed below grade to guard against inflow of water. These plugs are to be readily removable.

I. Place sleeves for all pipe penetrations and standards for railings in concrete work where indicated on the Drawings. Sleeves shall be of size and spacing required by the drawings to receive the standards and shall be set true and properly stayed to prevent displacement during the pouring of concrete. Where sleeves are not set true in proper locations, or are out of alignment, they shall be removed and properly replaced.

J. Anchor bolts for column baseplates shall be installed with templates provided. Vertical alignment and plan locations shall be maintained within 1/16 inch of the locations shown on the drawings.

K. Place in locations indicated on the drawings and as specified in Part 1 of this section, flexible waterstop system. Secure strip with cut nails to green concrete to hold in place. Material shall not be submerged or left exposed for extended periods of time. Should material exhibit swelling prior to confinement in joint, same shall be removed and replaced with new material.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. 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.

D. 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. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FLOOR FLATNESS/LEVELNESS TOLERANCES/MONOLITHIC SLAB FINISHES

FF defines the maximum floor curvature allowed over 24 inches computed on the basis of successive 12 inches (300 mm) elevation differentials, FF is commonly referred to as the "Flatness F-Number".

FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 foot (3.05 m) distance commonly referred to as the "Levelness F-Number".

All floors shall be measured in accordance with ASTM E 1155 "Standard Test Method for

Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).

All slabs shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Architect) shall be 2/3 of the specified tolerances.

All elevated slabs shall achieve the specified FL20 tolerance after the removal of the forms.

Refer to structural dwg's for specific concrete slab flatness requirements at new front entrance for curtainwall/revolving door.

Further, the Contractor is responsible for any "flash patching" as may be required to insure that all door frames set shall be set with head level throughout. Flash patching shall be feathered to a 1/4 inch in 10 foot level.

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement or synthetic bonded terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

After placing, surface shall be leveled to an FF15/FL17 tolerance. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand bed terrazzo, and as otherwise indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats, or by hand floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an FF20/FL17 tolerance.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface leveled to an

FF30/FL20 tolerance. Grind smooth surface defects which would telegraph through applied floor covering system.

3.8 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
   1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
   2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
   3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 shall be followed using wind breaks and sunshades when recommended. Evaporation retardant shall be as specified in Part 2 above.

B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture retaining cover curing, and by combinations thereof, as herein specified.
   1. Provide moisture curing by following methods. Keep concrete surface continuously wet by covering with water. Continuous water fog spray. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4 inch lap over adjacent absorptive covers.
   2. Provide moisture cover curing as follows: Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

C. Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Contractor shall employ appropriate curing methods for all slabs, including lightweight concrete slabs on deck, to meet their presumed schedule for finish work. Due to the higher inherent moisture content of lightweight concrete slabs, these slabs may take longer to dry to acceptable levels for application of floor covering, and adequate provisions shall be made by the contractor in the project schedule to allow for the curing and drying of these slabs.

E. Sealer and Dustproofer: Apply compound to exposed interior slabs noted on the drawings. These slabs must have received an initial coat of the curing and sealing compound.

3.9 REMOVAL OF FORMWORK, SHORING AND RESHORING

A. Contractor shall be responsible for proper removal of formwork, shoring, and reshoring.

B. Remove forms only after concrete has attained sufficient strength to support its shown weight, construction loads to be placed thereon and lateral loads, without damage to structure or excessive deflection.
Attention is directed to levelness criteria specified within as it impacts the removal of shoring systems.

C. Forms and supports shall remain in place for not less than minimum periods of time noted below. These periods represent cumulative number of days or fractions thereof, consecutive unless otherwise approved by Architect during which time mean daily air temperature at surfaces of concrete is above 50 degrees F.
1. Vertical surfaces: concrete shall have reached 100 day-degrees# and shall have attained strength of not less than 30% of requirements. Where such forms also support formwork for slab or beam soffits, removal times for latter shall govern.
2. Horizontal surfaces: except as noted below, concrete shall have reached 300 day-degrees# of curing and attained strength of not less than 60% of stated strength.
    a. Soffits of beams or girders shall remain supported and in place until concrete has attained 600 day-degrees#.
    b. Forms and supports of floor slabs shall remain in place until concrete has reached 400 day-degrees#.

    #Definition of day-degrees: Total number of days times mean daily air temperature at surfaces of concrete. For example, five days at temperature of 60 degrees F equals 300 day degrees. Days or fractions of days in which temperature is below 50 degrees F shall not be included in calculation of day-degrees.

D. Form removal shall be so performed that reshores are placed at same time as stripping operations, and that no area larger than one quarter of a slab panel is unsupported at any time.

E. Any test cylinders required to verify the specified minimum strengths for form removal shall be field cured under the same conditions as the concrete they represent. Such cylinders and testing shall be at the Contractor's expense.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in place construction. Provide other miscellaneous concrete filling shown or required to complete 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. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.11 JOINT FILLING

G. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

H. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

I. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

A. Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect. Cut out honeycomb, rock pockets, voids and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

B. For exposed to view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding surfaces. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes fill with dry pack mortar, or precast cement cone plugs secured in place with bonding surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

E. Repair of Unformed Surfaces: Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.015 inch wide or which penetrate to reinforcement or completely through nonreinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions. Cracks in slab on

grades are acceptable up to .02 inch wide.

F. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

G. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

H. Repair defective areas, except random cracks and single holes not exceeding 1 inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

I. Repair isolated random cracks and single holes not over 1 inch in diameter by dry pack method. Groove top of cracks and cut out holes to sound concrete and clean free of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry pack, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

J. Structural Repair: All structural repairs shall be made with prior approval of the Engineer as to method and procedure.

3.13 CUTTING AND PATCHING

A. Contractor for concrete work shall be responsible for all cutting, removing and patching work where concrete surfaces are not installed within the limits shown on the drawings or specified herein. All such work shall meet with the approval of the Architect/Engineer.

B. Where cutting and patching is required to accommodate the work of other subcontractors, such cutting shall be done at the expense of said subcontractors but shall be performed by the Contractor for concrete work.

C. The location and extent of cutting in completed concrete work and the patching thereof shall meet with the approval of the Architect/Engineer.

3.14 FIELD QUALITY CONTROL

A. Testing and Inspecting: The Owner shall engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.
2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. 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.
9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
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: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
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 does not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

3.15 CLEANING

A. Clean concrete surfaces free from objectionable stains as determined by the Architect. Materials containing acid in any form or methods which will damage "skin" of concrete surfaces shall not be employed, except where otherwise specified.

3.16 WASTE MANAGEMENT – Coordinate with Section 017419

A. Before concrete pours, designate locations or uses for excess concrete. Options include:
1. Additional paving
2. Post footing anchorage
3. Swale, riprap reinforcing
4. Flowable fill
5. Footing bottom, retaining wall footing ballast
6. Storm structure covers
7. Underground utility pipe kickers
8. Storm pipe flared end section
9. Toe wash protection, and shoulder and toe outfall restraints for temporary erosion pipes.

B. Before concrete pours, designate a location for cleaning out concrete trucks. Options include:
1. Company-owned site for that purpose (meeting environmental standards)
2. On-site area to be paved later in Project
3. Collect reinforcing steel and place in designated area for recycling.

End of Section

SECTION 076000 – SHEET METAL FLASHINGS & ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Sheet Metal Flashing & Accessory Work for this project as required by the schedules, keynotes and drawings and as generally outlined in Section 01 10 00, including, but not limited to the following:

1. Roof related sheet metal work and other miscellaneous flashings.

B. Perform Waste Management, coordinate with Section 01 74 19

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide each primary product, including each type of flashing and accessory, produced by a single Manufacturer, which has produced that type of product for not less than 5 years. Provide secondary products only as recommended in writing by the Manufacturer of the primary products.

B. Installer Qualifications:

1. A firm (Installer) with not less than 5 years' experience installing sheet metal items similar to those required for this project, employing personnel skilled in the work specified.

2. The Installer shall provide a reference list of at least three projects of comparable size and similar design, within a fifty-mile radius of this project, which may be observed by representatives of the Owner:

a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.

b. The Installer shall provide the reference list prior to contract award if requested.

3. The Installer shall directly employ the personnel performing the work of this section.

4. The Installer shall have a full-time supervisor/foreman on the roof when roofing work is in progress. The Supervisor shall have a minimum of 5 years' experience in roofing work similar in nature and scope to this project and speak fluent English.

C. Attend the Pre-roofing conference and review methods and procedures related to sheet metal work, including but not limited to the following:

1. How the application of sheet metal items will be coordinated with the installation of wood blocking, roofing & flashing materials, ice and water shield, insulation, underlayment, and other similar items to provide a watertight installation.

2. Commercial practice and the Manufacturer's instructions for handling and installing his materials.

3. The condition of sheet metal substrates, curbs, penetrations and other preparatory work needed and/or performed by other trades.

4. The schedule for mock-up construction and approval.

5. The construction schedule: availability of sheet metal materials, personnel, equipment and facilities needed to make progress and avoid delays.

6. Weather and forecasted weather conditions, and procedures for coping with unfavorable weather conditions.

1.5 SUBMITTALS

- As set forth in Article 14 of the General Conditions, prepare and submit a fully developed submittal schedule; review times for approval are 15 working days for primary review and 20 working days when a consultant is involved; note review times set forth above are deemed "average", for large submissions allow longer review times.
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

A. Submit the following items far enough in advance to obtain approval prior to performing any work:

1. Pre-work building leakage / damage report.

2. Shop drawings, or 2-foot-long samples, for each sheet metal item, to show how it will relate and fit on adjoining masonry and wood blocking assemblies, and with the roof assembly and flashings.

3. A 6-inch square piece of each type of sheet metal to show surface finish, texture and color.

4. Technical literature for each type of sheet metal, sealant and fastener, including shop drawings and installation instructions.

5. A sample of the Contractor's guarantee form.

6. Material Safety Data Sheets

B. Simultaneously provide all Material Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders.

C. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section.

1. Technical submittals shall be prepared and made by the firm that will actually perform the work.

D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 JOB MOCK-UPS

E. After the submittals are approved, prepare in actual job locations, mock-ups of cap flashings, hook strips, drip edges, fascia, gravel stops, gutters, leaders, and all other items of sheet metal and related work, for the inspection and approval of the Architect.

F. Construct each mock-up of two full lengths of metal, fastened, connected and stripped-in to the related roofing system, to show the following:

1. Type, gauge, color, cross-sectional dimensions and shape, and joint and mitering techniques.

2. Related masonry work, wood blocking, and the attachment techniques and fasteners for all wood and metal components.

3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.

G. The purpose of each mock-up is to establish the minimum standard of materials and workmanship, and to assure that completed work based on the mock-ups will be fully functional and will serve the purpose for it has been designed.

H. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until approved.

I. Do not purchase or fabricate sheet metal items until mock-up erection, inspection and approval are completed and approval is documented in writing.

1.7 GUARANTEE

J. Provide a Contractor's written Guarantee which warrants that all work will remain free of material and workmanship defects and in a watertight condition for a five-year period beginning upon Final Completion:

1. Defective work includes but is not limited to the following types of failure: leakage, delamination, lifting, loosening, splitting, cracking, and undue expansion.

2. The Contractor's Guarantee shall provide that the Contractor will make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.

3. The Guarantee shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to affect guaranteed repairs.

K. The Guarantee shall be issued no more than 30 days before the satisfactory completion of punch list work.

L. The Contractor’s Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion, i.e., Performance Bond Coverage does not run for the entire five-year term of the Contractor’s Guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For purposes of establishing standards of quality and levels of performance and not for the purposes of limiting competition, the basis of this specification is upon units as manufactured by one of the following and their respective model suitable for the intended purpose.

B. Copper sheet: ASTM B370, 99% pure copper, thickness 16 ounces per square foot.

C. Zinc-Tin coated copper: copper sheet, coated on both sides, with a smooth uniform coating of zinc and tin, nominal weight 16 ounces per square foot, cold rolled temper,

available as Freedom Gray Copper by Revere.

D. Use copper for all metal items not otherwise indicated.

E. Solder:

1. 50-50 tin and lead for plain copper, supplied in one-pound bars with the alloy mixture stamped into the bar by the Manufacturer.

2. Lead free / or pure tin solder for zinc-tin coated copper, Number 497 by Johnson Manufacturing.

F. Flux:

1. Water-Soluble Liquid Flux, Kester #3345 for iron soldering of brass and copper.

2. Tin-bearing flux such as “Flux-N-Solder E127 with pure tin” by Johnson Manufacturing.

G. Fasteners: stainless steel, or to match the sheet metal being fastened.

H. Bituminous plastic cement: Federal Specification SS-C-153B, Type 1, asbestos free grade.

I. Exterior mounted leaders and straps: .027-inch-thick rectangular corrugated aluminum leaders, factory finished with baked acrylic enamel. Fasten each leader with 1/16 inch thick by 1-inch-wide straps spaced 7 feet on center.

J. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.

K. Hat Sections: nominal 5/8 inch deep 20-gauge galvanized steel sections.

PART 3 - EXECUTION

3.1 GENERAL

A. Accurately reproduce the details and design shown, and form the profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.

B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

3.2 INSPECTION

C. Examine surfaces to receive work of this section and report to the Architect any defects affecting installation. Commencement of work will be construed as complete acceptance of surfaces.

3.3 INSTALLATION

D. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.

1. Form all joints to overlap 2 inches, secure the joints with rivets spaced 1 inch on-center, positioned about 1/4 inch from the raw edge - then sweat solder the joints.

2. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.

3. Clean soldered joints daily, immediately upon the completion of soldering, by washing with soap and water applied with a soft bristle brush, then rinsing with clear water.

E. Securely fasten and anchor all work and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only.

F. Use stainless steel pin Zamac type nail-in fasteners where fasteners will be exposed.

3.4 MISCELLANEOUS FLASHINGS

G. Fabricate apron flashings with 6-inch-wide exposed faces which finish with 1/2-inch hems and rounded corners. Fasten the exposed face with stainless steel screws and washers with neoprene inserts spaced uniformly about 12 inches apart along the bottom edge.

3.5 CLEANING, PROTECTION AND WATERTIGHTNESS

H. Conduct an inspection of the interior and exterior of each building, and grounds, and submit a written report of any pre-existing leakage or damage, prior to performing any work.

I. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be back charged for all leakage or damage which was not documented in the Contractor’s report or repaired to the Owner’s satisfaction at the Contractor’s expense.

J. Provide any equipment, material and labor necessary to protect the site, the building,

its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.

K. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.

L. Frequently clean up all refuse, rubbish, scrap materials and debris so the work site presents a neat, orderly and workmanlike appearance.

M. Sweep or blow the roof to remove all residual debris upon the completion of all work. After cleaning the roof, thoroughly clean all gutters and drains. Do not allow debris to enter the downspouts or underground drain lines.

3.6 WASTE MANAGEMENT - Coordinate with Section 01 74 19

N. Separate and recycle materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

O. Set aside and protect materials suitable for reuse and/or remanufacturing.

P. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

** END OF SECTION **

SECTION 077200 – ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section.

1.2 SUMMARY

A. All plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Roof specialties that are compatible with the roofing systems specified, including:
    a. Pre-fabricated curbs and equipment supports
    b. Roof walkway pads and concrete pavers.
    c. Aluminum access hatches with guard rails
    d. Pipe guard rail assemblies
2. Prepare, prime and paint all roof top equipment on the roof areas being replaced, and the miscellaneous rooftop items indicated.

B. Related Requirements

1. Sheet Metal Flashing & Specialties - Section 07 62 00

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.

    a. The Installer shall directly employ the personnel performing the work of this section.

    b. The Installer shall have a full time supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.

        1. Identify the intended Supervisor, and provide his resume prior to contract award if requested.

2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:

    a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number, and the Contractor's Supervisor's name.

    b. Provide the reference list prior to contract award if requested.

B. Material Quality: Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.

C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:

1. How the building will be kept watertight as work progresses.

2. How roof accessory work will be coordinated with the installation of the base sheet, insulation, cover board, roofing, flashings, and other items to provide a watertight installation.

3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.

4. The condition of the substrate, curbs, penetrations and other preparatory work needed.

5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.

6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.

7. A schedule for Manufacturer and Architect inspections.

1.4 SUBMITTALS

A. Submit the following items far enough in advance to obtain approval prior to performing any work:

1. A pre-work site and building inspection report with photos to document conditions before work starts.

2. Manufacturer's installation instructions and technical data sheets for each item. Material sample submittals are not needed unless requested to show color and texture.

3. Samples of the Contractor's and Manufacturer's guarantee/warranty forms.

B. Simultaneously provide all technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.

1. Technical submittals shall be made by the firm that will perform the actual work.

2. Submittals to be uploaded to Submittal Exchange for review.

C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.

D. Payment requisitions will not be processed until all submittals are received and approved.

1.2 GUARANTEE

A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:

1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, and undue expansion.

2. The Contractor shall make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense.

3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to make guarantee repairs.

4. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.

5. Guarantee coverage shall take effect no more than 30 days before the completion of all punch list work.

6. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide Manufacturer's standard units, modified as necessary to comply with the following minimum requirements:

1. Fabricate each unit in a shop to the greatest extent possible.

2. Aluminum Sheet: ASTM B 209 alloy 3003, tempered for forming and performance; mill finish, except as otherwise noted.

3. Extruded Aluminum: Standard extrusions alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch thickness for secondary framing and covers; mill finish, except as otherwise indicated.

4. Insulation: Rigid fiber glass boards where encapsulated inside metal skirts, rigid isocyanurate where covered with roof flashings on the exterior of curbs.

5. Wood Nailers: Dimension grade Douglas Fir, not less than 1-1/2 inches thick.

6. Fasteners: Nonmagnetic stainless steel or hot dipped galvanized steel, to match the finish of the material being fastened.

7. Gaskets: Tubular neoprene or polyvinyl chloride, or block sponge neoprene.

8. Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, non-migrating sealant.

2.2 PRE-FABRICATED CURBS AND EQUIPMENT SUPPORTS

A. Factory fabricated one piece full length welded 14 gauge galvanized steel, 24 inch high curbs, with nominal 2 inch thick wood nailers and T bar side reinforcing, Model ES-2 by Pate Inc.

B. Where the roof deck slopes more than 1/4 inch per foot, provide tapered curbs to match the slope, and install the equipment level.

2.3 ROOF WALKWAY PADS AND CONCRETE PAVERS

A. 2 inches thick, 24 inches by 24 inches precast concrete pavers, natural buff color and finish, minimum 7500 psi compressive strength as manufactured by Hanover Architectural Products.

B. 3/4 inch thick, 36 inches by 72 inches mineral surface asphalt composition walkway pads, manufactured by Meadows under the trade name "White Walk".

2.4 ALUMINUM ACCESS HATCHES

A. Hatches constructed of welded 11 gauge mill finish aluminum, with 12 inch high curbs and integral cap flashings, heavy pintle hinges, compression spring operators, a spring latch with interior and exterior handles, an interior padlock hasp, and stainless steel hardware, as manufactured by the Bilco Company, in the sizes needed to fit the deck openings, and as indicated.

2.5 HATCH SAFETY RAILS

A. Safety rails shall comply with OSHA Standard CFR 29 1910.23 and CFR 29 1910.27

B. Safety rails shall be bolted to the exterior surface of the curb above the flashing with 3/8 inch diameter stainless steel bolts, constructed of 1-1/2 inch diameter hot rolled electrically welded tubing meeting ASTM A500 Grade B, sized and configured to provide a safety railing on four sides of the hatch 42 inches above the roof surface with a self closing gate supported with heavy duty hinges with 5/8 inch diameter pins - basis of design: Roof Hatch Safety Rails by SafePro Roof Top Fall Protection.

C. Gate shall be fabricated of galvanized steel tubing, with no chains or latches.

D. Gate shall be powder paint coated, color shall be as selected by the Architect

2.6 PIPE GUARD RAIL ASSEMBLIES

A. Shop fabricate the guard rail assemblies from 1-1/4 inch inside diameter schedule 40 steel pipe - ASTM A53 grade B.

B. Shop prime the finished assemblies, then touch up the primer after installation, and install two coats of finish paint using a brush or roller.

2.7 PAINT AND PRIMER

A. Alkyd base rust inhibiting exterior primer and high gloss finish paint for ferrous metal surfaces as manufactured by Benjamin Moore or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Field measure existing openings. Comply with manufacturer's instructions and recommendations. Coordinate with the installation of roof deck, other substrates to receive specialty units, vapor barriers, roof insulation, roofing and flashing to ensure that each element of the work performs and fits properly, and that combined elements are waterproof and weather tight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3.2 ROOF HATCHES AND HATCH RAILS

A. Carefully remove existing roof hatch assemblies, wood blocking and shaft lining components.

B. Cut and remove portion of the existing deck and install new steel angles to reinforce the deck opening where new hatches are being installed at new locations.

C. Block solid under the hatch curb to support it at the level of the new roof; extend and restore the shaft liner.

D. Orient the hatches for proper egress, and install new flashings.

E. Install guard rails, fastened to the hatch frame, above the roof flashings.

3.3 GUARD RAIL ASSEMBLIES

A. Fabricate the guard rail in an iron shop in equal length sections to the configuration shown and to resist an individual point load of 200 pounds.

B. Carefully cut and cope all connections, and join them with continuous arc welds. Carefully grind all welds and adjoining surfaces smooth, after welding.

C. Provide telescoping inside expansion slip joints between sections a maximum of 20 feet on center.

D. Shop prime all fabricated items. Spot prime all field joints and scratches prior to finish painting with two coats of finish paint.

3.4 ROOF WALKWAY PADS AND CONCRETE PAVERS

A. Install concrete pavers spaced 5 feet on center for conduit and equipment pipe supports.

1. Install pavers over a piece of "White Walk" walk pad.

B. Install walkway pads to provide a path 3 feet wide, spot adhered to the roof surface, for walkways where shown, and under concrete pavers used for conduit and pipe supports.

3.5 PAINTING

A. Scrape and wire brush roof top equipment and the vent pipes to remove loose and peeling paint and surface rust.

B. Install one coat of primer and two finish coats of paint using a brush or roller. Wait 24 hours for each coat of paint to dry before applying the next coat.

3.6 MISCELLANEOUS

A. Provide and install any sealants needed, where shown or required.

B. Perform mechanical and electrical work using skilled and licensed tradesmen.

C. Provide new material, couplings, transition pieces, blocking, fasteners and the similar accessories needed to complete the work.

3.7 CLEANING, PROTECTION AND WATERTIGHTNESS

A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.

B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.

C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.

D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.

E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.

F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 078400 – FIRESTOPPING

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all firestopping and smoke seal work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

NOTES:
- Firestopping is defined as a material, or combination of materials, to restore the integrity of fire rated walls and floors by maintaining an effective barrier against the spread of flame, smoke and toxic gases and further defined in 1.04 below.
- Firestopping is subject Special Inspection and shall be accomplished by a specialty contractor experienced in this work and not by separate trades.

1. Provide firestopping and smoke seals as indicated on the drawings and/or required to maintain full and continuous smoke and fire barrier between zones including:
   a. Through penetration firestops and smoke-stops for all fire-rated bearing and non-bearing wall and floor assemblies, both blank (empty) and those accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
   b. Membrane penetration protection for fire-rated walls.
   c. Architectural/Construction joint firestops within walls, floors, or the intersection of floors to exterior walls, or the intersection of top of walls to ceilings.
   d. Top of wall and construction joint smoke-stopping in all smoke partitions.
   e. Work further includes any and all draftstop/acoustic stop annular packing for all partitions both rated and non-rated.

   Cope and seal around all structural elements to insure smoke and fire barriers.

   IT IS A MANDATE OF THIS CONTRACT THAT ALL FIRESTOPPING WORK BE ACCOMPLISHED BY A FM4991 ACCREDITED CONTRACTOR WITH AT LEAST ONE “Designated Responsible Individual (DRI)” IN THE EMPLOY OF THE SPECIALTY CONTRACTOR FIRM. A COPY OF THE QUALITY ASSURANCE MANUAL SHALL BE

MAINTAINED ON THE JOB SITE FOR REVIEW BY THE DESIGN PROFESSIONAL, CONTRACTOR AND ANY OTHER INTERESTED PARTY.

2. Provide "mice blocking" at all new vertical and horizontal penetrations, and at all existing penetrations which are exposed during the course of demolition and new construction.

NOTE: A preinstallation conference shall be scheduled by the Contractor with this Specialty Contractor and all other Specialty Contractors, Subcontractors and the like to establish procedures to maintain optimum working conditions and to coordinate the work of this Section with related and adjacent work.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification.

NOTE: Proper execution of this work will maintain the hourly ratings of the walls and floors and ensure progress of work in other Sections as listed below and further:

- Fire Rated: Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
- Non-Rated: Non-rated openings through floors and walls shall be sealed under applicable mechanical and electrical specification sections.
- Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions. Firestopping and smoke seals around outside of such mechanical and electrical assemblies, where they penetrate fire rated separations, are the responsibility of this section.

A. Division 23 - HVAC
B. Division 26 - Electrical Work

It is a project requirement that each individual trade provide sleeves for all pipe and conduit penetrations as part of their work.

1.4 QUALITY ASSURANCE
A. Firestopping systems (materials and design):
1. Shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479 fire tests in a configuration that is representative of field conditions.
2. The F rating must be a minimum of 1 hour but not less than the fire resistance rating of the assembly being penetrated.

3. T rating when required by code authority shall be based on measurement of the temperature rise on penetrating item(s).
4. The fire test shall be conducted with a minimum positive pressure differential of 0.03 inches of water column.
5. For joints, must be tested to UL 2079 or E 1399 and E 1966 with movement capabilities equal to those of the anticipated conditions.
6. Where there is no specific third party tested and classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFFRA) for submittal.

B. Firestopping materials and systems must be capable of closing or filling through-openings created by 1) the burning or melting of combustible pipes, cable jacketing, or pipe insulation materials, or 2) deflection of sheet metal due to thermal expansion (electrical and mechanical duct work).
C. Firestopping sealants must be flexible, allowing for normal pipe movement.
D. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
E. Firestopping materials shall be moisture resistant and may not dissolve in water after curing.
F. For firestopping exposed to view, traffic, moisture, and physical damage, provide appropriate firestop systems for these conditions.
G. All firestopping materials shall be manufactured by one manufacturer (to the maximum extent possible).
H. Material used shall be in accordance with the manufacturer’s written installation instructions.
I. Firestopping shall be performed by a Specialty Contractor trained or approved, in writing, by firestop material manufacturer. Said specialist shall be as defined in the Conditions. Equipment used shall be in accordance with firestop material manufacturer's written installation instructions.
J. Materials shall conform to all applicable governing codes.
K. All materials used in the work shall be certified "asbestos free" and shall be free from any and all solvents or components that require hazardous waste disposal or, that after curing, dissolve in water.
L. All materials shall comply with the interior finish flame spread and smoke developed requirements for the area in which they are installed. Coordinate with governing codes.
M. DEFINITIONS
    1. FIRESTOPPING: The use of a material or combination of materials in a fire-rated structure (wall or floor) where it has been breached, so as to restore the integrity of the fire rating on that wall or floor.
    2. SYSTEM: The use of a specific firestop material or combination of materials in conjunction with a specific wall or floor construction type and a specific penetrant(s), constitutes a "System"
    3. BARRIER: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

4. THROUGH-PENETRATION: Any penetration of a fire-rated wall or floor that completely breaches the barrier.
5. MEMBRANE-PENETRATION: Any penetration in a fire-rated wall that breaches only one side of the barrier.
6. CONSTRUCTION GAPS: Any gap, joint, or opening, whether static or dynamic, where the top of a wall may meet a floor; wall to wall applications; edge to edge floor configurations; floor to exterior wall; or any linear breach in a rated barrier. Where movement is required, the firestopping system must comply with UL2079 for dynamic joints.

1.5 SUBMITTALS

- As set forth in Article 14 of the General Conditions, prepare and submit a fully developed submittal schedule; review times for approval are 15 working days for primary review and 20 working days when a consultant is involved; note review times set forth above are deemed “average”, for large submissions allow longer review times.
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

NOTE: A "Certificate of Conformance", from the manufacturer listed in Part 2, is required with the "Submittal Package" to ensure that the material selected meets all of the criteria of this specification as set forth in Paragraph 1.04 of this Section.

A. Submit manufacturer’s product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria, and test data. Submittal should be in compliance with Article 14 of the General Conditions.
B. UL Tested Systems: Submit drawings showing typical installation details for the methods of installation. Indicate which firestop materials will be used and thickness for different hourly ratings.
C. Engineering Judgments: Submit manufacturer's drawings for all non-standard applications where no UL tested system exists. All drawings must indicate the "Tested" UL system upon which the judgment is based so as to assess the relevance of the judgment to some known performance.
D. Submit manufacturer’s installation procedures for each type of product.
E. Approved Applicator: Submit document from manufacturer wherein manufacturer recognizes the installer as qualified or submit a list of past projects to demonstrate capability to perform intended work.
F. Upon completion, installer shall provide written certification that materials were installed in accordance with the manufacturer’s installation instructions and details.
G. Mockups:
   1. Prepare job mockup of the material proposed for use in the project as

directed by Architect. Approved mockups shall be left in place as part of the finished project and will constitute the standard for remaining work, including aesthetics.

H. Material Safety Data Sheet (MSDS) must be submitted for each product.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING (Coordinate with Section 01 61 00)

A. Deliver all materials to be used in the work of this section to the project site in original sealed containers with manufacturer's brand and name, lot numbers, UL labeling, mixing and installation instructions clearly identified thereon.

B. Store all materials in accordance with manufacturer's directions. All materials shall be dated with shelf life and shall be removed from the project site at the contractor's expense if date is expired.

1.7 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)
1. E 814 - Standard Method of Fire Tests of Through Penetration Fire Stops.
2. E 119 - Methods of Fire Tests of Building Construction and Materials.
3. E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. E 136 - Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
5. E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths
6. E 1966 - Test Method for Resistance of Building Joint
7. E 2174 - Standard Practice for On-Site Inspection of Installed Fire Stops
8. E 05.11.14 - Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA); ASTM permanent number assignment pending approval of Draft

B. Underwriters Laboratories, Inc. (UL)
1. UL 1479 - Fire Tests of Through Penetration Fire Stops.
2. UL 263 - Fire Tests of Building Construction and Materials.
3. UL 723 - Surface Burning Characteristics of Building Materials.
4. UL 2079 Tests for Fire Resistance of Building Joint Systems
5. UL "Fire Resistance Directory", current year, including but not limited to the following:
   a. For penetrations by uninsulated, non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT) - UL System: CAJ1235, CAJ1404, WL1152.
   b. For penetrations by insulated, non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT) - UL System: CAJ5222, CAJ5250, CAJ5251, WL5171.
   c. For penetrations by PVC jacketed, flexible cable or cable bundles and plastic pipe (closed piping systems) - UL System: CAJ2401, CAJ3185, CAJ3199, CAJ3234, WL3118, WL3179, WL3199.

d. For penetrations by combustible plastic pipe (open piping systems) - UL System: CAJ2174, CAJ2339, CAJ2351, CAJ2432, WL2168, WL2170, WL2185, WL2259.
e. For penetrations by multiple combustible and/or non-combustible items - UL System: CAJ8101, CAJ8133, WL8007.
f. For large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways - UL System: CAJ1406, CAJ1502, CAJ4053, CAJ6027, WJ6004, WL1207, WL1343 WL4030, WL6018.
g. For penetrations by steel ducts - UL System: CAJ7075, CAJ7082, WJ7045, WJ7046, WL7006, WL7046, WL7081, WL7082.
h. For fire-rated construction joints and other gaps - OPL System: CEJ296P, CEJ302P.

6. For openings between structurally separate sections of wall and floors. At the top of walls - UL System: HWD0107, HWD0110, HWD0257, HWD0267, HWD0299, HWD0327, HWD0266, HWD0333, HWD0334.

C. Factory Mutual (FM) Approval Guide, current year.
1. FM Approval Standard of Firestop Contractors – Class 4991

D. Building code of the jurisdiction of the Work.

E. National Fire Protection Association
1. NFPA 101 - Life Safety Code.
2. NFPA 70 - National Electrical Code.
3. NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
4. NFPA 251 - Fire Tests of Building Construction and Materials

F. FICA “Manual of Practice”

G. Certification of “DRI” employee(s)

H. International Firestop Council (IFC):
1. Ref. 1 Recommended IFC Guidelines for Evaluating Firestop Engineering Judgments (April 2001)
2. Ref. 2 Inspectors Field Pocket Guide

1.8 PROJECT CONDITIONS

A. Conform to manufacturer's printed instructions for installation and when applicable, curing in accordance with temperature and humidity. Conform to ventilation and safety requirements.

B. Coordinate work required with work of other trades; firestopping shall, **where practical**, precede gypsum board or other applied sheet finishing operations.

C. Where firestopping is installed at locations which will remain exposed in the finished work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as required against damage from other construction operations.

1.9 SEQUENCING

A. Schedule firestopping after installation of penetrants but prior to concealing the openings.

B. Firestopping shall precede gypsum board finishing.

1.10 PROTECTION

A. A Where firestopping is installed at locations which will remain exposed in the completed work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as necessary against damage from other construction activities.

1.11 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
   1. Water based
   2. Water-soluble
   3. Can be cleaned up with water
   4. Non-flammable
   5. Biodegradable
   6. Low or preferably no Volatile Organic Compound (VOC) content
   7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere
   8. Manufactured without compounds that contribute to smog in the lower atmosphere
   9. Do not contain methylene-chloride
   10. Do not contain chlorinated hydrocarbons
   11. Contains the least possible of post-consumer or post-industrial waste

PART 2 - PRODUCTS

2.1 GENERAL

A. Firestopping materials and systems shall meet the requirements specified herein.
B. Architect must approve in writing any alternates to the materials and systems specified herein.
C. All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.
D. For applications where combustible penetrants are involved, i.e.. insulated and plastic pipe, a suitable intumescent material must be used.

2.2 SPECIFICATION STANDARD: For purposes of establishing standards of quality and levels of performance and not for the purposes of limiting competition, the basis of this specification is upon units as manufactured by one of the following and their respective model suitable for the intended application.

A. Hilti, Inc.
B. Specified Technologies, Inc.
C. Grace/IPC Corp.
D. Nelson Firestop Products
E. Tremco, Inc.

F. U.S. Gypsum Company
G. Johns Manville

2.3 PRODUCTS SHALL GENERALLY INCLUDE
A. Cast-In-sleeves (3M CID)
B. Mortar seals
C. Fire stop design sealant compounds, caulk and foam systems.
D. Putty and putty pads
E. Firestop kits including collars, plugs, etc.
F. Seal bags
G. Tapes and blankets
H. Intumescent design wrap strips
I. Mineral type unfaced safing insulation with third party wrap, 3.5 pcf density, UL R-10905 label
J. Top of Wall Mineral Wool Strips or Plugs (Hilti CP 767/777)

2.4 ACCESSORY ELEMENTS
A. Forming, damming materials shall be mineral fiber board or other suitable material recommended by nominated system manufacturer.
B. Primers, sealant and solvent cleaners shall be as recommended by the nominated system manufacturer.
C. Metal Systems - 20 gauge phosphatized, electrogalvanized steel plate and/or galvanized steel clips.

2.5 MICE BLOCKING
A. "Stuff Fit" copper mesh crack and crevice seal by Allen Special Products, P.O. Box 605, Montgomeryville, PA 18936.

2.6 Balance of materials shall be as specified elsewhere in this Section.

PART 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE
A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.
B. Verify that environmental conditions are safe and suitable for installation of firestop products.
C. Verify that all pipe, conduit, cable, and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 PREPARATION
A. The surface shall be dry, clean, and free of all foreign matter. Do not apply firestopping to surfaces previously painted or treated with a sealer, curing compound, water repellant or other coatings unless tests have been performed to

ensure compatibility of materials.

B. Provide primers as required which conform to manufacturer's recommendations for various substrates and conditions.
C. Mask where necessary to protect adjoining surfaces.
D. Remove excess material and stains on surfaces as required.

3.3 INSTALLATION - GENERAL SYSTEMS

A. Install in strict accordance with manufacturer's printed instructions as well as U.L guidelines and state and local fire codes.
B. Ensure that anchoring devices, backup materials, clips, sleeves, supports and other materials used in the actual fire test are installed.
C. Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal.
D. Tool or trowel exposed surfaces. Remove excess firestop material promptly as work progresses and upon completion.
E. Install dams when required to properly contain firestopping materials within openings and as required to achieve required fire resistance ratings. Combustible damming materials must be removed after appropriate curing. Incombustible damming materials may be left as a permanent component of the firestopping system.

3.4 FIRESTOPPING CONSTRUCTION AT INTERIOR WALLS, SHAFTS, ETC.

A. Install material of proper size on continuous plates or clips as required for proper support in order to safe-off area between exterior walls, interior walls and shafts and floor slabs and said walls and roof areas leaving NO VOIDS. Firestopping is required at all juncture conditions whether or not clips, angles or other structural elements exist either intermittently or continuously. Attach plates and/or clips to floor levels and other breaks and extend through framing to sheathing and/or other solid strata. Where metal decking flutes, either parallel or perpendicular to walls, occur and are open, same shall be fully packed and sealed with proper firestopping system. Where firestopping is accomplished after installation of drywall or other applied sheet finish, all spaces between penetrations and finish shall be filled to the thickness of said sheet finish with intumescent caulk.
B. At all linear openings, fill voids with a minimum of 6 inches of minimum 3.5 lb./cu.ft. density safing insulation as specified in Part 2 herein and cover entire surface with UL listed firestop sealant of one of nominated manufacturers identified in Part 2 herein.

3.5 PENETRATION SEALS

A. Penetrations are defined as conduits, cables, wires, piping, ducts or other elements passing through one or both outer surfaces of fire rated walls, floors or partitions and shall be firestopped on both sides of penetration in accordance with requirements set forth in Paragraph 1.04 of this Section.
B. Where sleeves are used, same shall be as specified in Part 2 herein; in event that sleeves are not used, core openings and caulk or wrap penetrating items with intumescent system the full length of penetration and seal on both sides with

intumescent caulk. Residual openings within square or rectangular holes shall be filled with compounds applicable for substrate encountered and all penetrations sealed on both sides with caulk.

3.6 MICE BLOCKING

A. At fire rated penetrations and at penetrations in finish areas, install copper mesh prior to filling or sealing the penetration.

3.7 FIELD QUALITY CONTROL

A. Contractor shall immediately notify the Architect if the firestopping systems herein specified cannot meet the requirements of the specification.
B. Contractor shall examine firestops to ensure proper installation and full compliance with this specification.
C. All areas of work must be accessible until inspection by the applicable Code authorities.
D. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification at no additional cost.

3.8 IDENTIFICATION

A. Identify firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
    1. The words: “Warning--Firestop System--Do Not Disturb. Notify Building Management of Any Damage.”
    2. Contractor’s name, address, and phone number
    3. Firestop system designation of applicable testing and inspecting agency
    4. Date of installation
    5. Firestop system manufacturer’s name
    6. Installer’s name

3.9 CLEANING

A. When finished work will be visible, clean adjacent surfaces in accordance with manufacturer's printed instructions.
B. If visible in the finished work, remove temporary dams after initial cure of firestops.
C. Correct staining and discoloring on adjacent surfaces.
D. Remove all debris and excess materials entirely from site and leave work in a neat and clean condition.

3.10 FIRESTOP SYSTEM SCHEDULE

A. The following schedules shall be completed by the Contractor and reviewed prior to submission to the Architect. The untitled table included shall be completed with each of the following categories of penetrating items.
    1. Single uninsulated metallic piping and conduit
    2. Multiple uninsulated metallic piping and conduit

3. Uninsulated plastic piping and conduit
4. Insulated metallic piping
5. Insulated high temperature flues and exhaust pipes (boiler flues, generator exhausts insulated with calcium silicate or other non-combustible insulation)
6. Cable tray
7. Electrical/telephone cable
8. Bus duct
9. Miscellaneous penetrations

B. Complete the additional tables for the following using the format provided.
1. Blanks, voids, holes
2. Engineering judgments
3. Fire rated/resistant joints
4. Ductwork engineering judgments

3.11 WASTE MANAGEMENT – Coordinate with Section 01 74 19

A. Separate and recycle materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
B. Set aside and protect materials suitable for reuse and/or remanufacturing.
C. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

PENETRATING ITEM:

Manufacturer/Product Name:
Color:
Accessories:

Floor/wall Construction	Item Size/ Description	Sleeve	F Rating	T Rating	Annular Space	Firestop Thickness	Tested Ass'y No.

BLANKS, VOIDS, HOLES

Manufacturer/Product Name:
Color:
Accessories:

Floor/wall Construction	Size/Description	F Rating	T Rating	Firestop Thickness	Tested Ass'y No.

ENGINEERING JUDGMENTS (Submit Actual Installation Drawing and Letter of Certification)

Manufacturer/Product Name:
Color:
Accessories:

Floor/wall Construction	Item Size/Description	F Rating	T Rating	Annular Space	Firestop Thickness	Packing Thickness

FIRE RATED/RESISTANT JOINTS

Manufacturer/Product Name:
Color:
Accessories:

Joint Description	F Rating	T Rating	Firestop Thickness	Tested Ass'y No.

DUCTWORK ENGINEERING JUDGMENTS

(Submit Actual Installation Drawing and Letter of Certification)

Manufacturer/Product Name:
Color:
Accessories:

Wall/Fl Const.	Size	Fire Damper	F	T	Annular Space Range	Firestop Thickness	Packing Thickness

End of Section

SECTION 079000 – CAULKING AND SEALING/JOINT SEALANTS

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all caulking and sealing work for this project as required by the schedules, keynotes and drawings.

NOTE: It will be the responsibility of the nominated supplier/suppliers of any sealant system proposed for use in the work to perform a "bond" test on all substrates to determine adhesion properties and requirement, if any, for primer application; coordinate with Article 1.05 herein.

1. Provide all interior joints between dissimilar materials as indicated or required to insure positive seals -

Sound integrity -	VI, Exposed; V, Concealed
Water penetration -	II
Light seals -	VI

NOTE: Sealants are generally required at locations where dissimilar materials abut each other in finished areas.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification. Bond testing shall be performed as noted in Paragraph 1.02.A above and results submitted to Architect for file.

A. All surfaces to receive sealant shall be dry and cleaned of all foreign matter as specified in Part 3.

B. Application devices shall have nozzles of proper size and shall provide sufficient pressure to completely fill joints as detailed.

C. Sealants shall comply with VOC requirements of the Jurisdiction of the Work, or in absence of said regulation, all material shall comply with the following as applicable for particular application and shall **not** contain or be formulated with aromatic solvents, halogenated solvents, fibrous talc or asbestos, formaldehyde, mercury, lead, cadmium, hexavalent chromium or their derivatives.

D. Reference Standards

1. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
2. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
3. ASTM C 834 - Latex Sealing Compounds
4. ASTM C 919 – Standard Practice for Use of Sealants in Acoustical

Applications.

5. ASTM C 920 - Elastomeric Joint Sealants.
6. ASTM C 1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
7. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
8. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
9. ASTM C 1311 – Solvent Release Sealants.
10. ASTM C 1330 – Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
11. ASTM C 1401 – Standard Guide for Structural Sealant Glazing
12. ASTM C 1481 – Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EFIS)
13. ASTM D 1056 - Flexible Cellular Materials, Sponge or Expanded Rubber.
14. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- As set forth in Article 14 of the General Conditions, prepare and submit a fully developed submittal schedule; review times for approval are 15 working days for primary review and 20 working days when a consultant is involved; note review times set forth above are deemed “average”, for large submissions allow longer review times.
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

A. Product Data indicating for each type of sealant and component used in this work - chemical characteristics; performance criteria; substrate preparation; limitations; color availability; and the like affecting the use of each product.
B. Samples of all components to be used in the work of this section.
C. Color charts for selection.
D. Schedule of sealant locations.
E. Test Reports:
   1. Submit results of laboratory pre-construction testing.
   2. Submit results of field pre-construction testing.
   3. Submit manufacturer's recommendations for joint preparation, priming, and joint accessory materials based on test results.
   4. Submit manufacturer's recommended installation procedure modifications resulting from field adhesion tests.
F. Manufacturer's installation instructions indicating, if any, special procedures; surface preparation; perimeter conditions requiring special attention; and like items

affecting installation of each product. ***Results of bond tests shall be incorporated in installation recommendations.***

G. Certification of specification compliance.
   1. Certify products are suitable for intended use and products meet or exceed specified requirements.
   2. Certify applicator is approved by manufacturer.

H. Qualifications Data: Submit applicator's qualifications, including reference projects of similar scope and complexity, with current phone numbers and contact names of architects and owners for verification.

I. Manufacturer's Field Reports:
   1. Indicate time present at project site.
   2. Include observations, indicate compliance with manufacturer's installation instructions, and supplemental instructions provided to installers.

J. Material Safety Data Sheet (MSDS) must be submitted for each product.

K. Operation and Maintenance Data:
   1. Submit recommended inspection intervals.
   2. Submit instructions for repairing and replacing failed sealant joints.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING (Coordinate with Section 01 61 00)

A. Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

B. Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations.

C. Condition products to approximately 60 to 70 degrees F (16 to 21 degrees C) for use in accordance with manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.6 SPECIAL GUARANTEE/WARRANTY TERMS

A. This Contractor shall, and hereby does warrant; and the Contractor shall, and hereby does guarantee that caulking and sealing work will be free from defects of materials and workmanship for 2 years from the date of final acceptance of this work.

B. Repair and replace work which becomes defective during the guarantee term, without cost to the Owner.

1.7 SITE ENVIRONMENTAL PROCEDURES

a. Indoor Air Quality: Temporary ventilation: Provide temporary ventilation during work of this Section. Coordinate interior application of joint sealants with interior finishes schedule.

1.8 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:

1. Water based.
2. Water-soluble.
3. Can be cleaned up with water.
4. Non-flammable.
5. Biodegradable.
6. Low or preferably no Volatile Organic Compound (VOC) content.
7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
8. Manufactured without compounds that contribute to smog in the lower atmosphere.
9. Do not contain methylene-chloride.
10. Do not contain chlorinated hydrocarbons.
11. Contains the least possible of post-consumer or post-industrial waste.

PART 2 - PRODUCTS

2.1 GENERAL

A. Joint primer, sealer and/or conditioner shall be as recommended by the sealant manufacturer for the surfaces to be adhered to.

B. Preformed joint fillers shall be nonstaining compatible with sealant and primer, and of a resilient nature and shall be one of the following:
   1. Expanded Polyethylene Joint Filler (for existing joints) - Flexible, compressible, closed-cell polyethylene of not less than 10 psi compression deflection (25%).
   2. Closed Cell Polyurethane Joint Filler (for pavements, walks, and curbs) - Resilient, compressible, semi-rigid; W.R. Meadow's Ceramar or A.C. Horn's Closed Cell Plastic Foam Filler, Code 5401.

C. Backer Rod for General Vertical Use: ASTM C 1330, Types B or C, rod stock closed cell polyethylene foam, closed cell neoprene foam, or open cell urethane foam, as recommended by sealant manufacturer as being compatible both with the sealant used and the primer. Provide the following products and certification that it meets the requirements or Architect approved substitute:
   1. SOF ROD as manufactured by Nomaco Inc. or Eva-Seal #30 Foam Backer Rod as manufactured by E-poxy Engineered Materials shall be used for all building joints. SOF ROD shall have a nonabsorbing outer skin and a highly resistant interior network of closed and open cells, which will not outgas when ruptured. Eva Seal #30 shall be a closed cell, cross-linked ethylene vinyl acetate copolymer foam.
   2. GREEN ROD as manufactured by Nomaco, Inc. shall be used for paving and floor joints. Rod shall be a closed cell polyethylene rod extruded in continuous lengths.
   3. Denver Foam as manufactured by Backer Rod Manufacturing and Supply Co.(Open Cell)

D. Accessory Items:
   1. Bond Breaker Tape - Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant; self-adhesive where

applicable; thickness, minimum 0.012 inch. Tapes manufactured by the following are acceptable:

a. #40 or #531 (heavy duty) Bond Breaker Tape as manufactured by Valley Industrial Products, Huntington, New York.
b. #50 Polyethylene Bond Breaker Tape as manufactured by Decker Mfg. Co., Fairfield, New Jersey.
c. CRL Bond Breaker Tape as manufactured by C.R. Laurence Company Inc.

2. Cleaning Solvents - Oil free solvents as recommended by the sealant manufacturer. Do not use reclaimed solvents.
3. Masking Tape - Removable paper or fiber tape, self-adhesive, non-staining.
4. Materials impregnated with oil, bitumen or similar materials shall not be used.

E. Sealant Colors
1. Exposed materials, provide color as indicated or, if not indicated, as selected by the Architect from manufacturer's standard colors.
2. Concealed materials, provide the natural color which has the best overall performance characteristics.

2.2 MATERIAL TABLE

NOTE: At the Contractors' option, a "Silyl-Terminated Polyether" compound as manufactured by BASF Building Products under the name "Sonolastic 150" or "ProSil[sct]1" by Pecora or "GreatSeal PE-150 Polyether Sealant" by STS Coatings, Inc. are acceptable for use in lieu of Type I and Type II materials as specified below.

A. Sealant materials shall be as follows and shall relate to scope of work described herein and shall form a general material reference for all sections performing sealant operations. Backer systems shall be as specified in Paragraph 2.01 above and as suitable for intended substrate and joint conditions.

B. Type - IA (For use with pavements, walks, curbs, plaza decks and other such locations) Sealant compound - 2 component self leveling polyurethane material similar and equal to -.
1. BASF Building Products (Sonolastic SL2 Horizontal)
2. Pecora (Urexpan NR-200 Horizontal/Dynatred Vertical)
3. Tremco (THC 900/901)
4. Mapei (Mapeflex P1 SL)

C. Type - II - GENERAL (For use in vertical expansion joints where extensive movement occurs and for general exterior sealant operations.) Sealant compound - 1 part, low-modulus silicone sealant similar and equal to -
1. Dow Corning (795)
2. General Electric (Silpruf)
3. Pecora (864)

4. BASF Building Products (Omniseal)
5. Tremco (Spectrem 1 or 2 as suitable for intended application)

D. Type - IIB - SANITARY SEALS - Material shall be a single component, mildew resistant silicone sealant similar and equal to -
1. Dow Corning - 786
2. General Electric - Sanitary 1700
3. Bostik - Silicone Rubber Bathroom Caulk.
4. Pecora - #898 or 863 at option of Contractor.
5. Tremco – Tremsil 200

E. Type - V (For use in acoustical sealing operations) - Sealant compound - Butyl Rubber or Latex Base for developing acoustical requirements specified. Material shall be similar and equal to -
1. Pecora (BA-98)
2. W.W. Henry (313)
3. U.S. Gypsum (Acoustical Sealant)
4. Tremco (Acoustical Sealant)
5. Mason Industries, Inc. (Acoustical Caulking CC-75)

F. Type - VI (For interior sealant systems around door frames, window reveals and like locations in painted surfaces) - Sealant compound – Siliconized Acrylic Latex or FDC Siliconized Acrylic each with a 50 year warrantee similar and equal to:
1. RCS20 by GE-Silicones.
2. DAP® ALEX PLUS® Acrylic Latex Caulk Plus Silicone
3. LIFETIME® Siliconized Acrylic by Red Devil
4. POWERHOUSE Siliconized Acrylic Latex Caulk by Sherwin Williams

G. Type - VII – Fire Rated Caulking compound for bedding and/or sealing of joints in rated gypsum wall systems shall be similar and equal to: “AC20 – FTR” by Pecora; “Tremstop Acrylic” by Tremco; “Blockade” by DAP; “FS 1900 Series Sealant Intumescent Elastomeric Firestop” by International Protective Coatings, Inc. or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE
A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 JOINT DESIGN
A. Joints shall be a maximum of 3/8 inch deep by minimum 3/8 inch wide.
B. Joints in concrete or masonry:
1. Depth of sealant shall equal width of joints in joints up to 1/2 inch wide;

joints 1/2 inch to 1 inch wide, depth shall be 1/2 inch.

2. For expansion joints or other joints 1 inch to 2 inch wide depth shall not be greater than 1/2 the applied sealant width and no greater than 5/8 inch for Type I nor 1/2 inch for Type II materials.

C. Joints in metal, glass and other non-porous surfaces: Depth shall be a minimum of 1/2 the applied sealant width, and shall in no case exceed the applied sealant width.

3.3 PREPARATION

A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.

B. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.

1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.
2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents.
3. Do not limit cleaning of joint surfaces to solvent wiping; use methods such as grinding, etching or other approved and manufacturer's recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.

C. For Pavements, Walks, and Curbs

1. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods, and sealants. Do not leave voids or gaps between the ends of joint filler units.
   a. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth-edged materials, use either cork joint filler or closed cell polyurethane joint filler.
   b. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges, use closed cell polyurethane joint filler.
   c. Prime all joint surfaces; Do not allow the primer/sealer to spill or migrate onto adjoining surfaces.

3.4 JOINT BACKING INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Prevent three sided adhesion by use of bond breaker tapes or backer rods at the back of the joint. Install backer rods for all liquid sealants, except where specifically recommended against by sealant manufacturers. Install backer rods immediately before sealants, do not permit backer rods to get wet. Install backer rods at the proper depth to create the specified sealant depth, avoid placing backer rods too deep which will result in sealant failure due to excessive sealant depth. Backup material shall be suitable size and shape so that when compressed 20 to 50%, it will fit in all joints where required. Do not cut or puncture the surface skin of the rod.

C. Apply masking tape where required by surfaces encountered, and as may be

determined by mockup testing, in continuous strips in alignment with joint edge. Remove tape immediately after joints have been sealed and tooled.

3.5 SEALANT INSTALLATION

A. Prime surfaces where required with primer recommended by sealant manufacturer and as determined by "bond" test required in Part 1 of this Section.

B. Apply, tool and finish sealant in accordance with manufacturer's recommendations.

C. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impracticable, install sealant by knife or by pouring, as applicable. "Gun" devices shall have nozzles of proper size and shall provide sufficient pressure to completely fill joints as detailed.

D. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.

1. **All tooling shall be "dry".**

3.6 FIELD QUALITY CONTROL

A. Require sealant manufacturer to be present at project site to:

1. Observe sealant mockup installation and to issue reports of observations.
2. Conduct field pre-construction testing.

B. Test Samples

1. If requested by the Architect, for each 1,000 linear feet of joint installed, cut out and carefully remove a 6 inch long sample of the undisturbed sealant and joint backer material from the newly installed Work. Remove the samples in the presence of the Testing Laboratory's Representative, who will retain them for evaluating and testing.
2. Reseal cutout areas with the same type materials.

3.7 CLEANING

A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection. Clean up remaining defacement caused by the Work.

C. All finished work shall be left in neat, clean condition.

3.8 WASTE MANAGEMENT – Coordinate with Section 01 74 19

A. Separate waste in accordance with the Waste Management Plan.

B. Close and seal tightly all partly used sealant containers and store protected in well-ventilated, fire-safe area at moderate temperature.

C. Place used sealant tubes and containers in areas designated for hazardous materials.

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

End of Section

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. 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.

1. Construction Specialties.
2. Airolite Co.
3. Reliable Metal Products.
4. 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. Post-installed 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: Per Contract Drawings
   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.

C. 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

SECTION 090000 – MISCELLANEOUS AND GENERAL FINISH WORK

PART 1-GENERAL

1.1 DESCRIPTION OF THE WORK

A. The work of this section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all incidental and miscellaneous finishing operations for this project as required, including, but not limited to the following:
   1. Patch, match and extend existing finishes where same are disturbed by alterations
   2. Painting of all disturbed areas as specified in Section 09 90 00.

1.2 RELATED WORK SPECIFIED ELSEWHERE- Entire Project Specification

1.3 QUALITY ASSURANCE

A. The work of this section shall be accomplished by a Specialty Contractor with mechanics skilled in each of the trades involved with the respective items specified herein.

B. All work of a nature conducive to high humidity conditions shall have been completed and be thoroughly dry. This contractor shall be held responsible for the cost of replacing all work of this section damaged due to his failure to take the above precautions.

C. All materials incorporated in the work of this PROJECT shall comply with the following: Class A, Flame Spread 0-25 interior finish shall be mandatory in corridors; passageways; stairs, exit ways; kitchens; maintenance, repair and custodial areas; trim/paneling systems in places of public assembly. Class C Flame Spread Less than 200 interior finish is mandatory in all instructional and office spaces. In any case, regardless of the flame spread classification, no material having a smoke developed rating of 450 or more may be used in any area of work on this project.

1.4 SUBMITTALS

- Submittals shall be made in groupings where installations are complementary, i.e. steel, steel decking, steel stairs, stair railings; roof systems/flashings; mechanical and electrical apparatus and the like. Failure to comply with this requirement will be cause for rejection of any or all submittals.
- The contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

A. Shop drawings of all fabricated items showing complete construction details,

erection requirements and fastenings.

B. Samples and certifications of specification compliance of all materials to be incorporated in this specified work.

C. Certification of Specification Compliance.

D. Where applicable, Contractor shall take all necessary field measurements prior to fabrication and shall assume complete responsibility for accuracy of same.

E. Manufacturers Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered to the job site in unopened factory sealed containers clearly labeled as to product, manufacturer, color and/or other pertinent characteristics.

B. Materials shall be stored under conditions recommended by the manufacturer.

1.6 REFERENCE STANDARDS

A. Except as otherwise specified herein, perform work in accordance with specifications noted below, including latest editions of applicable specifications, codes, and standards cited therein, and latest applicable addenda and supplements. Copies of these items shall be kept available in shop and field.

PART 2 – PRODUCTS – See Technical Sections and Drawings.

PART 3 -EXECUTION

3.1 INSTALLATION

A. Units shall be installed true to line and level by the manufacturer or his authorized representative in accordance with approved shop drawings.

B. All operating units shall be adjusted and left in perfect working order.

3.2 CLEANUP AND PROTECTION

A. Protect all adjacent work and finished surfaces from damage caused by the installation of the work of this Section.

B. Damage caused by the handling, storing or installation of the work herein, or failure to provide adequate protection of surrounding areas shall be repaired or replaced at no additional cost to the Owner.

C. All debris resulting from construction operations will be removed daily and upon final completion, all operating parts will be cleaned and protection removed.

3.3 WASTE MANAGEMENT

A. Separate and recycle materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

B. Set aside and protect materials suitable for reuse and/or remanufacturing.

C. Separate and fold up metal banding; flatten and place along with other metal

scrap for recycling in designated area.

*** End of Section ***

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the acoustical panel ceilings as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Acoustical panel units.
2. Exposed "T" suspension system, including hangers and inserts.
3. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
4. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
5. Perimeter and column moldings, trim and accessories for acoustical ceilings.

1.3 RELATED SECTIONS

A. Diffusers, grilles and related frames - Division 23.

B. Lighting fixtures - Division 26.

1.4 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contractor’s Association.

B. Qualifications of Installers

1. The suspended ceiling subcontractor shall have a record of successful installation of similar ceilings acceptable to Architect and shall be currently approved by the manufacturer of the ceiling suspension system.
2. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

C. The work is subject to the following standards:

1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.

2. ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.

D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by prevailing Codes and Ordinances.

1.5 SUBMITTALS

A. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:

1. Any deviations from Architect's reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into Architect's ceiling layout due to dimensional restrictions or field conditions.

2. Direction and spacing of suspension members and location of hangers for carrying suspension members.

3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.

4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.

5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane.

6. Details of construction and installation at all conditions.

7. Materials, gauges, thickness and finishes.

B. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.

1. Twelve (12) inch long components of suspension systems, including moldings.

2. Acoustical units — full size.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.8 COORDINATION

A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

1.9 EXTRA STOCK

A. Extra Stock: Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

A. Provide 3/4" thick, 24" x 24" mineral fiber panels Optima Open Plan #3354, tegular edge as manufactured by Armstrong World Industries or equal made by USG Interiors, Inc. or Rockwool Rockfon. Panels shall meet ASTM E 1264, Class A, with minimum flame spread of 25 and smoke developed of 50 per ASTM E 84.

2.2 SUSPENSION SYSTEM

A. Provide exposed "T" steel suspension system with low sheen white baked enamel finish “Prelude 15/16”” made by Armstrong World Industries or equal made by USG Interiors, Inc. or Chicago Metallic Corp.

B. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.

C. Provide min. 12 ga. galvanized wire hangers, soft annealed steel conforming to ASTM A 641, prestretched, Class 1 zinc coating, soft temper, size so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire.

D. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C 635.

E. Suspension systems shall conform to ASTM C 635, intermediate duty.

F. Provide manufacturer's standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas where acoustical panel ceilings are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

3.2 PREPARATION

A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION

A. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.

B. Install suspension systems to comply with ASTM C 636, with wire hangers supported only from building structural members. Locate hangers not more than 6" from each end and spaced 4'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0".

C. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

D. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system.

Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.

E. Install edge moldings at edges of each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.

1. Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than sixteen (16) inches o.c. between end holes. Fasten tight against vertical surfaces.

2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".

F. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

G. Install hold-down clips in toilet areas, and in areas where required by governing regulations; space 2'-0" o.c. on all cross tees.

H. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.

I. Where fixture or ceiling apparatus installation causes eccentric loading on runners, provide stabilizer bars to prevent rotation.

3.4 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, and suspension members; comply with manufacturer’s instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 099000 – PAINTING

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of the preparation, painting and finishing work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:

1. Prepare existing and new surfaces and coat all surfaces, including walls and ceilings exposed to view in the finished construction and scheduled to be painted.
2. Coordinate mechanical and electrical painting requirements with Divisions 23 and 26 for description and intent of work. Paint exposed mechanical and electrical piping, conduit, pipe insulation, junction boxes, electric panel covers etc. except in rooms labeled Utility Room, Boiler Room, Equipment Room and Mechanical Equipment Room.
3. Touch up all other work affected or damaged by the work of this Contract.
4. Perform balance of painting and finishing operations as may be necessary and/or required to "cover" all surfaces exposed to view in the finished construction.

NOTE: The bidders shall base their bid on the use of 2 base colors plus black and white, 2 accent colors plus "OSHA" type marking systems. Drawdowns to be 12 inches by 12 inches. All wall surface sand trim shall be “EGGSHELL”; all ceilings shall be “FLAT”.

Gloss Ratings:

Gloss Designation	Units at 60 Degrees	Units at 85 Degrees
Flat	0 to 5	Maximum 10
Eggshell	10 to 25	10 to 35
Satin	20 to 35	Minimum 35
Semigloss	35 to 70	
Gloss	70 to 85	
High Gloss	Minimum 85	

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification with specific reference to those sections noted above and as follows:

A. Non-ferrous metals, except as specified.
B. Factory prefinished items as specified.

1.4 QUALITY ASSURANCE

A. The work of this Section shall be accomplished by a "Specialty Contractor".
B. Field quality control shall be obtained by review of first finished area or item of each color scheme as required by the Architect for color, texture and workmanship. Said area, or areas, when accepted will serve as the minimum project standard for all ensuing work.
C. All workmanship, restrictions, preparation, and the like shall be in accordance with the "Spec-Data" guidelines as published by the manufacturer for the particular product line as well as the standards as promulgated by the Painting and Decorating Contractors Association for high quality institutional applications.
    1. SSPC-SP 1 - Solvent Cleaning
    2. SSPC-SP 2 - Hand Tool Cleaning
    3. SSPC-SP 3 - Power Tool Cleaning
    4. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete
    5. EPA-Method 24
D. Before and during the application of interior finishing, varnishing, painting, etc. and until final acceptance by the Owner of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 50 degrees F nor more than 90 degrees F (air surface & material), relative humidity of 85% maximum and at least 5 degrees F above dew point-See manufacturers data pages for all application condition restrictions before starting any work. Air and surface temperatures shall be maintained within the parameters set forth in the manufacturer’s printed application instructions.
E. Regulatory Requirements
    1. Applicable building code.
    2. New York State Department of Environmental Conservation - Part 205 in "Architectural Surface Coatings" - for Volatile Organic Compounds (VOC).
    3. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Construction Industry Standards (29 CFR 1926/1910), Revised 10/1/79, Washington, DC.
    4. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Construction Industry Standards Part 1926.62, Lead Standard.
    5. Refer to www.otcair.org for all VOC restrictions and complying States.
F. Materials used for the work of this Sections shall, where applicable be VOC compliant with the latest rulings from the EPA and shall further meet LEED requirements which are set by Green Seal, Inc. In addition, the Green Seal recommendations that paints be formulated without specific harmful ingredients (e.g., formaldehyde, benzene) and heavy metals (e.g., cadmium, lead, mercury) shall be enforced. For architectural coatings other than paint, systems shall comply with the California Air Resources Board (ARB) Suggested Control Measure for Architectural Coatings (June 2000) and/or the South Coast Air Quality Management District’s Rule 1113.

1.5 SUBMITTALS

- As set forth in Article 14 of the General Conditions, prepare and submit a fully developed submittal schedule; review times for approval are 15 working days for primary review and 20 working days when a consultant is involved; note review times set forth above are deemed "average", for large submissions allow longer review times.
- The Contractor is encouraged to submit for approval products made from recycled and/or environmentally responsible material. Every effort will be made by the Design Professional Team to approve these materials; the substitution request procedure shall still be enforced.

A. Certification of specification compliance with manufacturer's certificates and test reports as may be required by the Architect.

B. Product Data: Provide manufacturers' product literature for all materials specified and material manufacturer's printed directions and recommendations for environmental conditions, surface preparation, priming, mixing, reduction, spreading rate, application, and storage, as applicable for each of the materials specified; further –
   1. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
   2. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
   3. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
   4. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

C. Samples
   1. Initial Selection: Submit manufacturer's color charts for each type of finish for approval by the Architect. Verify colors specified with manufacturers' color charts for availability and notify the Architect if any discrepancies should occur.
   2. Verification prior to installation
      a. When required by Architect, submit, without cost to the Owner, two samples of each color and material on 12 inch by 12 inch hard-board.
      b. Submit two samples of finish on concrete masonry, drywall, metal or other surfaces as required until acceptable color, sheen and texture are achieved.
   3. Submit samples of finished (stained and painted) wood in triplicate for approval. Samples shall be 4 inches by 8 inches samples of the species of wood specified, stained and/or painted as required and clearly labeled with type of coating, number of coats applied, etc.
   4. All samples shall be labeled; and include the following information:
      a. Manufacturer's name
      b. Type of paint/stain/hardener
      c. Manufacturer's stock number

d. Color: name and number
e. Instructions for reducing, where applicable
f. VOC content

D. Provide field samples of finish and refinish operations at locations directed "on-site" for approval prior to start of any finish work.
E. Material Safety Data Sheet (MSDS) must be submitted for each product.
F. Local/Regional Materials:
1. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
2. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
3. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
4. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING (Coordinate with Section 01 61 00)
A. Each container of material delivered to the project site shall contain label with the following information contained thereon:
1. Manufacturer's name and location.
2. Type of Paint/Stain/Hardener (type of coating).
3. Manufacturer's stock number.
4. Color: Name and Number
5. Instructions for reducing, where applicable.
6. Label analysis including solids (weight and volume); component mix; flash point; VOC analysis; viscosity and like components as well as any and all restrictions on use.
B. Sampling of Materials:
1. When requested by the Architect, obtain test samples from material stored at project site or source of supply.
2. Furnish from materials designated by the Architect:
a. 1 quart (0.946 liters) - From batches of 50 gallons (37.84 liters) or less
b. 2 quarts (1.892 liters) - From batches over 50 gallons (37.84 liters).
3. Select samples at random from sealed containers.
C. Store all materials in designated spaces in a manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this Section. Each space shall be provided with a fire extinguisher of Carbon Dioxide or Dry Chemical type bearing the label of the National Board of Fire Underwriter's and tag of most recent inspection.
D. Protect work at all times. Protect adjacent work and materials by suitable coverings or other methods as work progresses.

E. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied. Do not apply finishes in any area where dust is being generated.
   1. Do not apply initial coating until moisture content is within limitations recommended by paint manufacturer.
      a. Test with moisture meter.

1.7 DEFINITION OF TERMS

A. The term "Painting" wherever used herein, means the application of all coatings such as paint, primer, enamel, varnish, shellac, oil, etc. as listed in the Painting Schedules.

B. Standard coating terms defined in ASTM D 16 apply to this Section.
   - Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
   - Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
   - Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
   - Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

C. The term "Painting" shall also include preparation of surfaces for such applications, and the cleanup as hereinafter specified.

D. The term "Walls" means all vertical surfaces from floor, or top of base, or top of wainscot, to ceiling or hung ceiling.
   1. Include pilasters, breaks, jambs, reveals, returns, arches.
   2. Include hardboards, pegboards.
   3. Include free standing columns, low partitions.
   4. Include interiors of all enclosed spaces.

E. The term "Ceilings" means the general overhead horizontal surfaces including cornices, fascias, arches, soffits, stair soffits, metal frame of ceiling lights and the like.

F. Strip and Refinish – Intended for areas with multiple layers of stain, paint or other coatings. Remove existing finishes to substrate with aqueous based cleaners. Perform necessary repairs with compatible materials.

   NOTE: Mockups of each of the above finish definitions shall be prepared on a representative size sample of substrate to demonstrate means and methods and a full recording of materials, times, processes and the like shall be made and submitted for record purposes.

1.8 SITE ENVIRONMENTAL PROCEDURES

A. Indoor Air Quality: Provide temporary ventilation as specified in Section 01 50 00 – Temporary Facilities.

1.9 SUSTAINABILITY

A. In the selection of the products and materials of this section as well as for the entire project, preference will be given to those with the following characteristics:
   1. Water based
   2. Water-soluble
   3. Can be cleaned up with water
   4. Non-flammable
   5. Biodegradable
   6. Low or preferably no Volatile Organic Compound (VOC) content
   7. Manufactured without compounds that contribute to ozone depletion in the upper atmosphere
   8. Manufactured without compounds that contribute to smog in the lower atmosphere
   9. Do not contain methylene-chloride
   10. Do not contain chlorinated hydrocarbons
   11. Contains the least possible of post-consumer or post-industrial waste

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials used in the work shall be pure, of best quality, and "Top-of-Line" of approved manufacturer.

ALL MATERIALS USED IN THE WORK OF THIS PROJECT SHALL BE V.O.C. COMPLIANT IN ACCORDANCE WITH LATEST RULINGS OF THE FEDERAL EPA AND THOSE ESTABLISHED JURISDICTION AS REFERENCED IN PARAGRAPH 1.04 OF THIS SECTION.

B. Materials which are specified by brand and make shall be furnished and used as specified.

C. Where other brands are considered by the Contractor as equal or desirable, such brands shall be used only after written approval of the Architect is obtained.

D. If proposed brand has not been specified, the name of the manufacturer shall be submitted to the Architect for approval, and these materials shall be of such grades and makes as to produce perfect and durable finishes.

E. Paint used for all interior work shall contain an anti-mildew additive which shall be lead free. Paint shall contain less than 0.06 percent lead by weight (of total non-volatile solids).

F. Wall Paint Colors (General and Accent colors) to be used: to be determined by Architect

2.2 ACCEPTABLE MANUFACTURERS - PAINT

A. Benj. Moore (Water Based Eco-Spec)

B. Sherwin-Williams (Promar 200 Zero VOC Line)

C. PPG Industries (Pure Performance)

2.3 MISCELLANEOUS MATERIALS

A. Turpentine, mineral spirits and other solvents and thinners shall be pure, of highest grade and approved manufacture.
B. Shellac shall be fresh, first grade quality white shellac.
C. Poultice: For removal of paint from existing surfaces, "poultice method": "Peel-Away" product in suitable formulation for intended use as manufactured by Dumond Chemical, 1501 Broadway, New York, NY.
D. Brushes, rollers and other application tools as required compatible with the nature of the removal chemicals.
E. Scrapers: Standard and specially fabricated for removing softened paint when poultice method is used. All metal scrapers shall have rounded corners so as not to gouge wood surfaces.
F. Steel wool and hand sanders for removing paint from crevices and depressions in wood following poultice treatment.

2.4 MIXING

A. All paint shall be thoroughly mixed, the mixture shall be of uniform color and consistency, and shall be in thoroughly strained condition before being applied.
B. Thinning will not be permitted unless the manufacturer's directions require same for the method of application to be used (e.g., brush, roller or spray).
C. Provide galvanized iron pans of suitable size in which all material transfer and mixing shall be done.

2.5 SURFACES NOT TO BE PAINTED

A. Polished or bright metals: Aluminum, bronze, brass, chrome, nickel, stainless steel, copper
B. Brick, stone, masonry, concrete (unless scoped and/or scheduled), cement, factory prefinished masonry block
C. Glass and aluminum framing and insulated panel work
D. Chain Link Fence Work
E. Ceramic Materials, Terrazzo, Marble, Bluestone
F. Plastic Laminate surfaced millwork, casework, doors and the like
G. Resilient Flooring Materials; Wood Floors unless scoped and/or scheduled
H. Factory finished Wood Doors
I. Acoustical Tile and Metal Pan Ceilings
J. Chalk Boards; Cork Boards; Bulletin Boards
K. Mechanical Equipment, Steel Shelving, and Cabinets, which are factory finished.
L. General Construction Items with factory applied final finish
M. Pipe and Duct Spaces
N. Oil Tank Enclosure
O. Meter Room
P. Concealed Ducts, Pipes and Conduit

2.6 INTERIOR SURFACES

A. Concrete
1. Walls, Ceilings and other exposed surfaces - 1 coat primer; 1 finish coat

2. Ceilings – 1 coat, spray or roller applied fine sand texture finish using “Zinzer” sand additive in flat latex paint

B. Gypsum Drywall Work -
1. Recoating - Touch up with primer followed by 2 finish coats
2. New Drywall - 1 coat primer; 2 finish coats
3. Walls to receive eggshell finish
4. Ceiling to receive flat finish

C. Concrete Masonry - Special coating as specified elsewhere in this Section

D. Metals - repair all abraded spots and spot prime preprimed surfaces with compatible materials and treat all surfaces as follows:
1. Dry Spaces
a. Ducts, piping, conduits and related items in finished spaces - 1 coat primer, 1 coat finish
b. Ducts, piping, conduits and related items in exposed and painted areas - 1 coat dry fallout spray
c. Preprimed surfaces - prepare as above, 2 finish coats
2. Wet Spaces - Special coating as specified elsewhere in this section
3. Doors, frames and the like shall be finished as for "dry" or "wet" spaces above
4. Trim to receive semi-gloss finish

E. Exposed Overhead Structure and Surfaces in all areas where exposed structure is scheduled to be painted.
1. 2 coats of dry fall out spray. Apply each coat at 3.5 to 4.0 mils wet to produce a D.F.T. of 2.0 mils per coat.

2.7 PAINTING OF EXPOSED MECHANICAL AND ELECTRICAL WORK – Coordinate with Divisions 23 and 26.

A. In general, the exposed items in all areas of the Work are painted in with the wall or ceiling surfaces and the specifications listed above cover the respective surfaces.

B. Painting under the Work of this SECTION is not required on:
1. Any mechanical materials in mechanical rooms.
2. Any electrical materials in electrical closets.
3. Electrical wiremold or bus duct which has a factory finish.

C. Painting required under the Work of this SECTION covers the following:
1. Paint all fan coil unit enclosures, radiation covers, grilles and registers in walls and ceilings, fire extinguisher cabinets, hose cabinets, etc., not having factory applied finish. A factory applied prime coat is not a finish. Refer to the mechanical specifications to determine what items are only primed and will, therefore, require field finish under the work of this SECTION.
2. Paint all exposed electrical conduit and panelboards in all areas of the Work in with the wall finish in each room.
3. Paint all exposed mechanical piping which runs vertically or horizontally on wall surfaces.

D. Painting in Mechanical Rooms:

1. The omission of painting in mechanical rooms as listed above under "B" is only referring to General Contractor's painting.
2. Painting of mechanical room materials may be required to be performed under the Mechanical Work by the Mechanical Trade. See requirements listed in Division 23 for materials, finishes and colors to be installed by the Mechanical Trades.

PART 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 WORKMANSHIP AND APPLICATION

A. Mix and apply all materials in strict accordance with the manufacturer's instructions and shall be performed by experienced mechanics trained in the application of the specified finish materials.
B. Spread all materials evenly without runs, sags or blemishes.
C. Surface preparation, both initial and intermediate, shall include any required sanding, steel wool wiping, or other such treatment to even out any imperfections in base substrate before application of ensuing coats. Further, thoroughly clean, smooth and properly prepare all surfaces scheduled to receive finishing and/or exposed to view in the finished construction. Surfaces shall be dust and dirt free. Surface conditions and substances which may bleed through and which cause non-uniformity of finish or otherwise may spoil the final appearance desired by the Architect or affect the durability of the finish shall be removed, primed, or otherwise treated, as necessary to insure full coverage.
D. Prior to finishing, fill all holes, dents, joints, cracks, and irregularities in surfaces scheduled for paint finish with an approved spackle mixture suitable for the material and purpose. When dry these areas shall be sandpapered smooth and flush with adjoining surfaces.
E. Wash metal surfaces with mineral spirits to remove any dirt or grease before applying materials. When rust or scale is present use wire brush or sandpaper. Clean before painting. Clean coats of paint that become marred. Touch up with specified primer.
F. Where multiple coats of paint are specified, tint each preceding coat.

NOTE: Primer coat shall be tinted; first finish coat of selected color. Second finish coat subject to modification by the Architect based upon "dry" appearance as per Paragraph 1.03 herein.

G. All coats shall be thoroughly dry before applying succeeding coats.
H. Shellac all pitch pockets, streaks and knots. Putty all nail and similar holes or defects in exterior and interior finish woodwork with whiting putty, colored as

necessary.

I. Hardware, accessories, fixtures and other items installed prior to painting, shall be removed, protected and replaced after painting.

J. For shop primed material follow applicable specification for intended use as per schedule.

K. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.

L. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.

M. Apply primer on all work before glazing.

N. Refinish whole surface area where portion of finish has been damaged or is not acceptable.

O. When galvanized steel is shop or field welded the damaged zinc areas shall be repaired as follows:
   1. Wire brush all damaged areas to shiny metal.
   2. Apply two coats (each to 2.0 dmt) of 95% zinc rich paint to all cleaned and prepared surfaces.

P. Contractor shall follow the white board paint manufacturers wall preparation requirements prior to installation.

3.3 LEAD PAINT PROTOCOLS

A. Any room in which scraping, painting or plastering is to be done must be emptied of books and papers, furniture, curtains and carpets to the greatest extent possible. **Such removals are deemed to be the sole responsibility of the Owner**.

B. Any items remaining in the room shall be wrapped or covered with two layers of 6 mil polyethylene.

C. The bottom layer of polyethylene shall not be removed from those furnishings until the room has been cleared for reoccupancy.

D. Generally, for window removal or jobs that disturb areas larger than two square feet, the entire floor shall be covered with two sheets of 6 mil polyethylene, taped to the floor or baseboard and taped together to prevent dust from penetrating this covering. The doorway shall be sealed with two layers of 6 mil polyethylene. To allow entry, the first layer may be taped across the top and left side and the second across the top and tight side. Alternative methods including zip protective systems may be used.

E. All air vents in the work area shall be closed and covered with plastic unless they are feeding air into the room. Lights in the work area shall be covered with plastic and sealed to prevent dust from settling in them.

F. Loose and peeling paint or plaster shall be removed wet, using water misting to reduce dust caused by the removal. Lead paint shall not be scraped or sanded when dry.

G. A special high efficiency particulate air (HEPA) filtration vacuum, which is able to filter out fine lead dust particles, shall be used to remove lead dust. Where operations are limited to sanding, scraping and other such preparation, HEPA equipped tools are a viable alternative to such vacuum systems.

H. When renovation work is completed, the walls, floors, cabinets, window sills, moldings, and electrical and plumbing fixtures shall be washed with detergent.

3.4 CLEANING

A. Remove spilled, splashed, or splattered paint from all surfaces. Touchup and restore finish where damaged.
B. Do not mar surface finish on item being cleaned.
C. Leave storage spaces used in the work of this Section clean and in proper condition for required usage originally intended.

3.5 WASTE MANAGEMENT – Coordinate with Section 01 74 19

A. Separate waste in accordance with the Waste Management Plan. Set aside extra paint for future color matches, or reuse by Owner, school theater set designers, Habitat for Humanity, etc. Where local options exist for leftover paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility.
B. Close and tightly seal all partly used paint and finish containers and store protected in well-ventilated, fire-safe area at moderate temperature.
C. Place empty containers of solvent-based paints in areas designated for hazardous materials.
D. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.

End of Section

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 heat pump units and indoor VRF fan coil units.
4. Energy Recovery Ventilators.
5. Air handling units and related appurtenances.
6. All required piping, valves and related specialties.
7. D/X and hot water coils and related appurtenances.
8. Variable frequency drives.
9. Sheetmetal ductwork and related accessories.
10. Duct and pipe insulation.
11. Registers, diffusers, and dampers.
12. Rigging of equipment.
13. 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.

14. Air and Water Balancing.

15. Automatic temperature controls with complete wiring (regardless of voltage).

16. Testing, adjusting and start-up of equipment.

17. Painting and identification of all equipment and piping.

18. Firestopping per NFPA requirements (UL approved systems).

19. Operating and maintenance instructions.

20. As-Built Drawings - Refer to Division 1.

21. Cutting and Patching - Refer to Division 1.

22. 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 al 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 SEPARATOR

A. Furnish and install as shown on Drawings, an external low velocity air separator unit consisting of a steel tank with screwed piping connections and a tapping to connect the air separator directly to the compression tank with screwed piping connections and a tapping to connect the air separator directly to compression tank.

B. The unit is to be furnished with a steel base and constructed in accordance with ASME boiler pressure vessel code and stamped 125 psi working pressure. The air separator shall be ITT Bell & Gossett “Rolairtrol” or approved equal.

2.2 EXPANSION TANKS (S)

A. Furnish and install pre-charged bladder type expansion tank(s) of size and capacity as shown on Drawings. Tank shall have carbon steel shell and heavy-duty butyl rubber bladder.

B. Tank to be constructed for (125 psig) working pressure and to be guaranteed leakproof by manufacturer. Tank to be stamped with "U" symbol and Form U-1 furnished denoting compliance with paragraph U-69 for Construction of Unfired Pressure Vessels Section VIII ASME.

2.3 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.

2.4 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.

2.5 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.

2.6 TRIPLE DUTY VALVES

A. Furnish and install at each pump a nonslam check valve with a spring loaded disc and a calibrated adjustment feature permitting regulation of pump discharge flow and shut-off. Valves shall be designed to permit repacking under full line pressure.

B. Unit shall be installed on discharge side of pump in a horizontal or vertical position with the stem up. Allow for minimum clearance of valve stem. This unit shall be cast iron body construction suitable for maximum working pressure of 175 psig and maximum operating temperature of 300 degrees F.

C. All units shall be ITT Bell & Gossett Triple Duty Valve model or approved equal.

2.7 SUCTION DIFFUSERS

A. Furnish and install at each pump a suction diffuser. Units shall consist of angle type body with inlet vanes and combination Diffuser-Strainer-Orifice Cylinder with 3/16 inch diameter openings for pump protection. A permanent magnet shall be located within the flow stream and shall be removable for cleaning.

B. The orifice cylinder shall be equipped with a disposable fine mesh strainer, which shall be removed after system startup. Orifice cylinder shall have a free area equal to five times cross section area of pump suction opening. Vane length shall be no less than 2-1/2 times the pump connection diameter. Unit shall be provided with adjustable support foot to carry weight of suction piping. Each Suction Diffuser to be ITT Bell & Gossett model or approved equal.

2.8 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. 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

50-03-04-03-0-004-020 Nyack Middle School
50-03-04-03-0-006-016 Liberty Elementary School
50-03-04-03-0-001-016 Valley Cottage Elementary School
50-03-04-03-0-007-023 Upper Nyack Elementary School

SECTION 230230 - UNIT VENTILATORS

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. Unit ventilators are designed for floor mounting. Units shall incorporate direct expansion cooling and hot water, heat as specified. Units are available with Direct Digital Controls (DDC) that can be incorporated into a LonWorks or BACNet network. Indoor air quality is assured with dehumidification and ventilation options.

1.2 STANDARDS

A. Units shall be tested and certified in accordance with AHRI Standard 840.

B. Unit shall be constructed and listed in accordance with ETL and ETL, Canada standards (ANSI/UL 1995-1999, second edition) (CAN/CSA C22.2 NO 2 36-95).

C. Unit insulation and adhesive shall meet the requirements for flame spread rating of lower than 25 per ASTM E84 and smoke generation rating of lower than 50 per ASTM E84. Only closed cell insulation shall be used. The use of fiberglass insulation is not acceptable.

D. Each coil shall be factory tested for leakage at 350-psig air pressure with coil submerged in water.

PART 2 – PRODUCTS

2.1 UNIT VENTILATORS

A. The unit shall be a factory-assembled bolt-together unit ventilator. Contained within the unit enclosure shall be factory-installed motor, wiring, blowers, coil(s), bearing, outdoor/return air damper, optional face/bypass damper and optional controls. Unit shall have a draw-thru design for uniform air distribution across the coil and even discharge temperatures.

2.2 CONSTRUCTION AND COMPONENTS

A. Construction:
   1. Unit frame shall be constructed of heavy gauge galvanized steel components that form a rigid foundation and resist corrosion.

2. Unit composed of three main sub-assembled modules: Blower Module, Coil Module and Damper Module. Modules shall be removable without disassembling the unit.

3. Modules shall be externally insulated using closed cell insulation.

4. Unit back shall be insulated using closed cell insulation.

5. Exterior access panels shall be constructed of heavy gauge galvanized steel that has been cleaned and pretreated before painting to maximize corrosion resistance. Exterior service access panels shall be retained by tamper-resistant fasteners. Panels are electrostatically coated with polyester powder baked on textured paint.

B. MAUV (Vertical Unit)

1. Unit standard depth of 16 5/8 in. (21 7/8 in. depth optional), 30-in. tall cabinet with three standard 16-gauge exposed front panels, and service access panels with tamper-resistant hex socket head threaded fasteners and retainer chains for safety and ease of service. 14-gauge panels are optional.

2. Cabinet models shall have standard textured baked powder finished panels. Cabinet tops shall be charcoal bronze as standard with a steel bar-stock discharge grille. Optional textured baked power paint colors to match panels will be available for cabinet top. Unit top shall be easily removed for routine maintenance.

3. External access panels shall be easily removed from outside of the unit for easy access to filters and routine maintenance. End panel corners shall be welded and ground smooth for appearance and durability.

4. Unit shall include leveling legs to compensate for floor irregularities.

C. Components:

1. Coils:

a. Hot water coils shall be constructed of mechanically expanded copper tubing with a minimum wall of 0.016 in., inside aluminum fins shall have a minimum thickness of 0.045 in. Coils shall have a factory-mounted low limit device mounted on the leaving side of the heating coil. The device shall be single-pole, double-throw and shall activate at 38 F if the capillary device senses a temperature change along any 6 in. of the device.

b. Direct expansion (DX) coils shall be furnished with a thermal expansion valve sized to accommodate the condensing unit selected to meet the load.
c. All coils shall be pressure tested at no less than 350 psig at the factory to ensure that they are leak tight.
e. Dual capillary type thermal sensing elements, one automatic reset and one manual reset, shall be employed to protect the unit from overheating in the event of abnormal operation.
f. Each circuit above 48 amps shall be protected by its own fuses rated for the duty and voltage to which they are applied
g. The unit must be constructed such that troubleshooting or adjustment of the controls can be done while the unit is operating normally.

2. Pipe Tunnel: Vertical units shall have an integral pipe tunnel that can be used for piping across the unit. This tunnel shall be insulated, with closed cell insulation, from the unit and accessible from each end compartments to allow maximum flexibility of crossover piping installation.

3. Drain Pans:

a. Unit drain pan shall be double sloped welded galvanized steel or stainless steel to prevent standing water.
b. Drain pan will be coated to prevent external condensation during cooling.
c. Drain connections shall be supplied on both ends of pan for field conversion of slope and drain hand connection if required.
d. Drain pan slope shall be field convertible without removing the coil module.
e. Heating only units shall come equipped with a double sloped drain pan for future cooling needs.

4. Fans and Motor:

a. Fan and motor assembly shall be direct driven. One end of drive shaft shall be mounted in a sleeve-type or ball bearing, with other end of shaft supported by motor bearings.
b. Fan wheels shall be double-width, double-inlet with forward-curved blades, and shall operate at low speed. Fan wheels shall be mounted on a hollow one piece steel shaft.
c. Fan wheels shall be statically and dynamically balanced.
d. Fan (blower) housings shall be constructed from heavy-gauge steel and mounted to a heavy-gauge galvanized steel fan deck.
e. To prevent vibration transmission to the unit frame, motor and shaft bearing shall be resiliently mounted. The drive shaft shall be connected to motor with a flexible coupling.

f. Fan motors shall be mounted outside of the airstream on a heavy-gauge steel partition and removable without removing the blower module.
g. Standard shall be supplied with permanently split capacitor (PSC) multi-tap transformer motors. Units that are used in high-static applications or that require higher efficiency shall be supplied with 3-speed, 120, 240 or 277 volt, single-phase, 60 Hz, electronically commutated motors (ECM). Units without controls shall be supplied with permanently split capacitor (PSC) multi-tap transformer motors. All motors shall have integral high temperature reset and shall be protected with cartridge-type fuse(s).

5. Filters:

a. Unit shall be supplied with a one piece 1-in. throwaway filter. The unit shall be capable of incorporating a 2 in. filter. For even loading, filter shall be positioned to filter mixed outdoor and return air.
b. Filter track shall be field adjustable to accept 1-in. or 2-in. permanent or renewable media replacement filters.

6. Dampers:

a. Unit shall contain a single outdoor-air/return-air damper with a continuous seal the length of the damper. The Damper shall be constructed of extruded aluminum that has an integral curved web to afford maximum rigidity. External closed cell insulation shall be applied. The damper assembly shall include an anti-draft plate to prohibit outdoor air from penetrating the classrooms through the damper assembly.
b. A single face and bypass damper with a continuous seal the length of the damper constructed of extruded aluminum shall be available.

7. Controls and Safeties:

a. The manufacturer shall furnish, install, wire and factory test a complete control package suitable for the unit type(s) selected. The control package shall be capable of stand-alone operation and shall have all of the necessary sensors and accessories to monitor, control and ensure complete and safe operation of the unit.
b. The minimum position of the outdoor-air/ return-air actuator shall be adjustable by the installing contractor and/or the owner/ operator.
c. ASHRAE Cycles II shall be available.

8. Special Features:

a. Cabinet full adapter back shall be available with an open space behind the back of cabinet for piping and electrical conduits. Cabinet will be properly gusseted to support the top of unit over the false back area.

b. Valve package options shall include all valves required for both 2-way and 3-way cooling and heating applications. Valve package options shall include wye strainers, flow setters, P/T (pressure/temperature) ports, ball valve and unions. The valve package shall include all valves required to match to the ASHRAE II control cycle.
c. Optional End panels with cutouts to match adapter backs or custom needs. End panels shall be available in 1 in. standard sizes with 2”-4” sizes available.
d. Sub bases shall be available as an option for vertical units in sizes 2” to 12”.
e. A dual mount Wall Stat shall be provided with units containing factory supplied DDC Controls and be capable of wall mounting.
f. Units shall be capable of accepting a field installed CO2 sensor with the factory installed IAQ DDC Control packages.
g. Outdoor Air Louvers shall be available in vertical and horizontal blade styles. Options shall include with and without decorative lattice.
h. Trim flanges shall be available for horizontal units.
i. Touch-up paint shall be available to match cabinet color.
j. Architectural accessories shall be available to install together with vertical units. Cabinets in standard sizes 2’ to 5’ available with custom options.

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 230230

SECTION 230235 - INDOOR WHEEL TYPE ENERGY RECOVERY VENTILATOR

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: Similar to “Topvex FR Series” or approved equal.

1. Model: Topvex FR800HW--208-3-CAV; FR3800HW-208-3-CAV
2. Indoor, compact, commercial, air handling units.
3. Hot Water Coil
4. Airflow Control Constant 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.

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. 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 MER13 pockets filter constructed to meet UL 900.
2. Exhaust air protected by MER9 pockets filter constructed to meet UL 900.
3. Individual Pockets: Assembled into galvanized steel header providing rigid support to filter.
4. 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 neutral line.
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 microprocessor controller.

J. Serviceability:

1. Access Panel: Hinged and/or screwed access panel on bottom of unit.
2. Sliding Door System: Minimize clearance requirements for maintenance.
3. Energy Recovery Wheels, Filters, and Motors: serviceable from front of unit.
4. Fan Assemblies: Mounted on removable base.
5. Energy Recovery Wheel 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. Control Wiring: Installed in system daisy-chain configuration from unit to BAS controller and to other units, if applicable.
4. Network Wiring: CAT-5ew/RJ-45.

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 SOURCE QULITY CONTROL

A. Run test at factory.

2.5 ACCESSORIES

A. Hydronic Re-Heat

B. Shut-Off Damper

C. Fast Clamp 2 – Piece net

D. Sliding Door Kit

E. Temperature Sensor

F. 3-Way Valve Actuator

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 230236 – ROOFTOP ENERGY RECOVERY VENTILATOR

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 PRODUCT SPECIFICATION

A. The Energy Recovery Ventilator shall be as manufactured by "Systemair" or approved equal provided all specifications are met. Systemair ERV commercial series shall be used as the basis of design.

B. Requirements

1. Unit shall be listed to safety standard UL 1995 / CSA C22.2 No. 236, Heating and Cooling Equipment.

2. Performance shall be as scheduled on plans.

3. Exhaust discharge hood shall have integrated backdraft damper.

4. The unit shall be capable of operating in winter and summer conditions without any loss of ventilation capacity.

5. The Energy recovery wheel shall be of aluminum counter flow construction type coated with a thin non-migrating adsorbent layer.

6. The fans shall be external-rotor motorized impellors powered by electronically-commutated (EC) motors, controlled by a provided potentiometer or by a 0-10 VDC or 4-20 mA signal provided by others.

PART 2 – PRODUCTS

2.1 CABINET

A. Cabinet shall be constructed of G90 galvanized, 20 gauge steel sheet. All exposed surfaces shall be coated with baked powder paint. All seams shall be sealed, requiring no caulking at job site.

B. Unit casing shall be double wall with 25mm (1 inch) fiberglass insulated. The flame spread index of the insulation material shall not be over 25 and its smoke developed index shall not be over 50 when tested in accordance with the Standard for Tests for Surface Burning Characteristics of Building Material, UL723.

2.2 WEATHER HOODS

A. Weather hoods shall be constructed of G90 galvanized, 20 gauge steel sheet.

B. The fresh air weather hood shall be protected by MERV1 washable filter.

C. Weather hoods shall be designed to prevent wet snow and large water droplets from entering the unit.

D. The fresh air weather hood shall maintain a face velocity less than 1.6 m/s (340 ft/min).

2.3 ENERGY RECOVERY WHEEL

A. The rotor matrix shall be made of a corrosion resistant aluminum alloy that is composed of alternating corrugated and flat, continuously wound layers of uniform widths; that guarantees laminar air flow, and low static pressure loss. The rotor wheel shall be reinforced with spokes, welded at the hub and perimeter to prevent any uneven run out during normal operations. All corrugated surface shall be coated with a thin non-migrating adsorbent layer. The wheels effectiveness shall be clearly documented in accordance with ASHRAE 84 and AHRI 1060 standards. The flame spread index of the energy recovery wheel shall not be over 25 and its smoke development index shall not be over 50 when tested in accordance with the Standard for Tests for Surface Burning Characteristics of Building Material, UL723

2.4 ELECTRICAL

A. Electrical box shall be isolated from the airflows and all integral wires and connections protected.

B. All internal electrical components shall be factory wired for single point power connection.

C. All electrical components shall be UL Listed or Recognized and ETL Certified or Accepted where applicable and wired in compliance with the National Electrical Code.

2.5 FAN SECTIONS & MOTORS

A. Fans shall be backward inclined motorized impellers.

B. Motors shall be electronic-commutate (EC), controlled by a provided potentiometer or by a 0-10 VDC or 4-20 mA signal provided by others.

C. Fan motor shall have maintenance-free permanently lubricated sealed ball bearings.

D. Fan motor shall be (TOP) thermal overload protected.

E. Fan motor shall be UL listed to UL1004 and/or UL2111, CSA C22.2 No. 77 and No.100.

F. Fan motor shall have IP protection class 44 or 54 according to DIN 40 050.

G. Separate fans for exhaust and supply blowers shall be provided.

2.6 FILTERS

A. The fresh air shall be protected by MERV13 pleated filters constructed to meet UL 900.

B. The exhaust air shall be protected by MERV7 50mm (2 inches) pleated filters constructed to meet UL 900.

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 SERVICEABILITY

A. Unit shall have hinged and/or screwed access panels on front.

B. Energy recovery wheel, filters and motors shall be serviceable from the front of the unit.

C. Fan assemblies shall be mounted on a removable sliding base. Energy recovery wheel and filters shall be mounted in slide-out rails for ease of inspection, removal, and cleaning.

3.3 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.

C. Unit shall be seated on a roof curb or on a platform.

D. Unit shall be seated on a roof curb or on a platform.

3.4 WARRANTY

A. The energy recovery ventilator shall be warranted to be free from defects in material, workmanship and on all parts for a period of 3 year from the purchase date. The energy recovery wheel shall be warranted to be free from defects in material and workmanship for a 3 years period under circumstances of normal use.

3.5 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 230236

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.

PART 2 – PRODUCTS

2.1 EQUIPMENT (STANDARD)

A. Decentralized, Rooftop Units

B. 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.

C. Economizer and Control compartment:

1. Shall be 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.

D. 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 FOR HVAC

A. Sensors and Transmitters:

B. Thermostats:
1. Energize "Y": when calling for cooling and "W" when calling for heating.
2. Shall have capability to energize 2 different stages of cooling, and 2 different stages of heating.

2.3 DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

A. Decentralized, Rooftop Units:

B. Simplicity SMART Equipment Control :
1. Shall be ASHRAE 62 complaint.
2. Shall accept 20-30 VAC input power, 50/60 hz. 24 VAC nominal.
3. shall have an operating temperature range from -40°F to 158°F;
10-90% RH (non-condensing UI), 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.

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 230260 – SPLIT ROOFTOP DEDICATED OUTDOOR AIR 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 SYSTEM DESCRIPTION

A. Split Dedicated Outdoor Air System are matched with an Outdoor Heat Recovery VRF Unit.

1.2 DELIVERY, STORAGE & HANDLING

A. Units shall be stored and handled per unit manufacturer’s recommendations.

PART 2 – PRODUCTS

2.1 DEDICATED OUTDOOR AIR SYSTEM – SPLIT ROOFTOP

A. General

1. Provide outside air unit as manufactured by LG or approved equal.
2. Alternate manufacturers must be 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 connectable to remote condensing units for heating/cooling/dehumidification and for outdoor installation.
5. Integral Energy Recovery device shall be a rotary air-to-air total enthalpy wheel. Heat source shall be from remote heat pump condenser.
6. Cooling source shall be split system remote condenser with invertor compressors.
7. Airflow arrangement shall be Outdoor Air only/Outdoor Air with Recirculation.
8. Each unit shall be constructed in a horizontal configuration and shall incorporate additional product requirements as listed in this specification.

2.2 CASING/PANEL

A. Unit’s exterior walls, roof, and access doors shall be double wall foam injected construction. Exterior wall supplied using 19 gauge SGCC galvanized steel with proprietary pre-painted material in the following finish color; Dawn Gray-RAL 7037.

B. Cabinet Insulation shall be urethane foam with total thermal resistance of R12.

2.3 CABINET ASSEMBLY

A. All the internal assemblies shall have a minimum of 18 gauge, SGCC galvanized steel, except for motor supports which shall be minimum 13 gauge galvanized SGCC steel.

B. All specified components and internal accessories factory installed shall be tested and prepared for single-point high voltage connection.

C. Unit shall be fully assembled at the factory and consists of the following:

1. An insulated double wall metal cabinet.
2. Downturn outdoor air intake hood with 1” aluminum mesh filter assembly.
3. Energy wheel.
4. DX Main coil.
5. Hot gas reheat coil.
6. Secondary energy recovery DX Coil.
7. Condensate drain pan.
8. Integrated Heat Recovery Box.
9. Motorized dampers.
10. Sensors.
11. Supply air blower assembly.
12. Exhaust blower assembly.
13. Filter assembly for DX Main coil with 2” Thick MERV 8 filters, rack for future 4” filters.
14. Filter assemble for ERV Wheel return and outdoor air sides.
15. Electrical control center.

D. Supply Air blower assemblies

1. Blower assembly shall consist of an electric motor and direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails. Blower motor shall be capable of continuous speed modulation and controlled by Inverter Fan Motor PCB.

E. Exhaust Air blower assemblies

1. Blower assembly shall consist of an electric motor and direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails. Blower motor shall be capable of continuous speed modulation and controlled by Inverter Fan Motor PCB.

F. Access panels / doors

1. Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components.

2. Doors and access panels shall be fabricated of minimum Internal 21 gauge galvanized SGCC steel and external 19 gauge SGCC galvanized steel with 2 inch closed cell foam insulation.

G. Main DX (Evaporator) Coil

1. 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.

2. The evaporator coil is coated with Blackfin coil coating, E-Coat coated coils are tested and passed ASTM B-117 Salt Spray tests exceeding 5,000 hours.

H. Hot Gas Reheat Coil

1. 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.

2. The evaporator coil is coated with Blackfin coil coating, E-Coat coated coils are tested and passed ASTM B-117 Salt Spray tests exceeding 5,000 hours.

I. Secondary Heat Recovery Coil

1. Heat recovery coil shall be (silver) soldered or brazed into the refrigerant system. Coil in located at exhaust side of ER wheel and operates in cooling mode, acting as additional condenser coil for outdoor unit. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a SGCC steel frame.

2. The evaporator coil is coated with Blackfin coil coating, E-Coat coated coils are tested and passed ASTM B-117 Salt Spray tests exceeding 5,000 hours.

J. Control panel / connections

1. 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.

K. Condensate drain pan:

1. 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.

2. Drain pan shall be sloped in two directions to provide positive draining and drain connector shall be sealed at penetration through cabinet wall.

L. P trap

1. Contractor shall provide, or fabricate, and install an appropriate P trap, in accordance with all local and area codes and Best Practices.

M. Energy wheel

1. Unit energy wheel shall handle the full volume of outdoor and exhaust air without an energy wheel bypass damper(s).

2. Energy wheel shall be of total enthalpy, rotary air-to-air type and shall be an element of a removable energy wheel cassette.

3. 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.

   a. The cassette shall incorporate a pre-tensioned urethane drive belt or a link style belt.

4. The wheel media shall be unique corrugated synthetic fiber-based media impregnated with a non-migrating water selective molecular sieve desiccant. The fiber and desiccant, intimately bound together in our process, form sheets with excellent heat and mass transfer properties which are corrugated and spirally wound into wheels. Unlike other media, the desiccant is uniformly and permanently dispersed throughout the matrix structure in contrast to being coated, bonded, or synthesized onto the matrix, and thus is not susceptible to delamination or erosion of the desiccant material. Performance criteria are to be as specified in AHRI Standard 1060, complying with the Combined Efficiency data in the submittal.

N. Wheel Frost Control

1. Control system shall include an exhaust air thermostat to initiate frost control sequence and will start/stop the wheel and decrease supply fan speed.

O. Control and Diagnostics

1. The DOAS system shall be controlled by an onboard digital controller (DDC) that indicates both owner-supplied settings and fault conditions that may occur.

2. The DDC shall be programmed to indicate the following faults:

    a. Global alarm condition (active when there is at least one alarm)
    b. Supply Air Proving alarm
    c. Dirty Filter alarm
    d. Outdoor Unit (condenser) Error Alarm
    e. Supply Air Temperature Low Limit Alarm
        i. Sensor #1 Out of Range (outside air temperature)
        ii. Sensor #2 Out of Range (supply air temperature)
        iii. Sensor #3 Out of Range (cold coil leaving air temperature

P. Motorized dampers / Outdoor Air / Return Air

1. Damper shall be of low leakage AMCA Class 1A certified construction.

2. Leakage rate shall not exceed 3 CFM/ft2 @ 1 in. wg. and shall be factory installed.

3. AMCA Class 1A motorized recirculating air damper designed to permit 100% maximum recirculation of return air shall be factory installed.

Q. 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.

1. Factory install sensors:

    a. Supply Air Temperature Sensor
    b. Outdoor Air Temperature Sensor
    c. Outdoor Air Humidity Sensor
    d. Exhaust Air Temperature Sensor
    e. Wheel Supply Air Temperature Sensor

2. Field Supplied and Installed Sensors (Optional)

    a. Supply Duct Air Temperature Sensor
    b. Supply Duct Air Humidity Sensor
    c. Space Temperature Sensor
    d. Space Humidity Sensor
    e. Space CO2 Sensor

2.4 BLOWER/MOTOR ASSEMBLY

A. Blower section construction Supply Air:

1. Direct drive motor(s) and blower(s) shall be assembled on a 13 gauge galvanized steel platform.

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, LG 3D Plug fan with painted steel wheels statically and dynamically balanced and AMCA certified for air and sound performance.

3. Blower section motor source quality control.

a. Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency.

b. Ratings are to be established in accordance with AMCA 210, “Laboratory Methods of Testing Fans for Rating.”

B. Motors

1. General

a. 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.

2.5 FILTER ASSEMBLY

A. Units shall have supply final air filter shall be of 2 inch MERV 8 with filter rack that can accept 4” thick field supplied filters up to MERV 14.

1. Hood filter shall be of 1 inch aluminum type.

2. Energy recovery section shall have outdoor air and exhaust air filters of 2 inch MERV 8.

2.6 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 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.

C. RTU supply fan shall be configured for Constant Volume.

1. Capacity Control: Control air volume by RPM percentage.

2. CFM Control: Fan to follow target CFM set by user and automatically adjust for external static pressure changes.

D. Exhaust fan shall be configured for Constant Volume

1. Capacity Control: Control air volume by RPM percentage.

2. CFM Control: Fan to follow target CFM set by user and automatically adjust for external static pressure changes.

E. Outside Air / Return Air damper control shall be field adjustable two-position.

F. Operating protocol

1. The DDC shall be factory-programmed for Bacnet IP and Modbus RTU standard.

2. Must be compatible with LG AC Smart Controller.

3. Graphical Web UI required.

G. Embedded web page with complete web user interface to allow full remote control and monitoring of unit.

H. Airflow monitoring available at supply fan using factory installed differential pressure sensor.

I. Supply Air Dirty filter sensor factory installed.

J. Alarm Recording: Controller shall store all alarm events.

K. Alarm Operating Snapshot Controller shall store operating inputs and outputs at time of alarm.

2.7 SUBMITTALS

A. Product Data: For each type or model include the following:

1. Complete fan performance curves for Supply Air and Exhaust Air.
2. Sound performance data for Supply Air and Exhaust Air.
3. Motor ratings, electrical characteristics, motor and fan accessories.
4. Performance ratings for all coils.
5. Dimensioned drawings for each type of installation 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. Cabinet finish Dawn Gray-RAL 7037 is standard.
10. Energy wheel performance data for both summer and winter operation.

2.8 CONNECTIONS

A. In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

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 230260

SECTION 230265 - 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 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 MULTI V™5 HEAT RECOVERY AND HEAT PUMP SYSTEM(S) – (6 to 42 tons nominal)

MULTI V™S HEAT PUMP AND HEAT RECOVERY SYSTEM(S) – (2 to 5 tons nominal)

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-continuous 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 manufacturers 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.
   a. 2 to 20 ton units shall be a single frame only.
   b. 22 to 34 ton units shall be dual frame only.
   c. 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 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 horizontal with the addition of optional factory provided air guides.
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 requires 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 ARUN024GSS4 ~ ARUN053GSS4:

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 Polyolester oil (POE) shall not be acceptable. Compressor inverter drive shall 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 model ARUB060GSS4:

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 230270 - 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 – 4 WAY

A. General

1. Unit shall be manufactured by LG.
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 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
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 four supply air outlets and one return air inlet.
2. The supply air outlet shall be through four 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.
4. 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. uto fan operation
    p. Leak detection logic

D. Fan Assembly

1. 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.
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. The drain pump shall have a safety switch to shut off the unit if condensate rises too high in the drain pan.
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. 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.
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: 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: 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: 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 230270

SECTION 230280 - VARIABLE FREQUENCY DRIVES

PART 1 – GENERAL

1.1 CONTRACT REQUIREMENTS

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.2 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.

1.3 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.

1.4 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.

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 CASED COIL SECTIONS

A. Coils 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 insulated galvanized steel casing and are mounted pitched in the unit casing with stainless steel drain pan. Coils are to be removable in casing.

C. General Fabrication:

1. All water and refrigerant coils shall have minimum 1/2-in. OD copper tubes mechanically expanded into fins to ensure high thermal performance with lower total flow and pumping requirements. Minimum tube wall thickness shall be 0.016 inches. Optional tube wall thickness of 0.025 in. shall be supplied, if specified.

2. Optionally, water coils shall have minimum 5/8-in. OD copper tubes mechanically expanded into fins to ensure high thermal performance with lower total flow and pumping requirements. Minimum tube wall thickness shall be 0.020 inches. Optional tube wall thickness of 0.035 in. shall be supplied, if specified.

3. Aluminum plate fin type with belled collars. Optional copper plate fins shall be supplied, if specified.

4. Aluminum-finned coils shall be supplied with die-formed casing and tube sheets of mill galvanized steel or stainless steel as specified. Copper-finned coils shall be supplied with stainless steel casing and tube sheets.

D. Hydronic Heating Coils:

1. Headers shall be constructed of steel with steel MPT connections. Headers shall have drain and vent connections accessible from the exterior of the unit. Optional non-ferrous headers and nipples shall be supplied if specified.

2. Configuration: Coils shall be drainable, with non-trapping circuits. Coils will be suitable for a design working pressure of 300 psig at 200 F.

E. Refrigerant Coils:

1. Headers shall be constructed of copper with brazed joints.

2. Standard circuiting selections include:

a. Single distributor arrangement for sizes 03 through 17.
b. Row split intertwined, multiple distributor arrangement for sizes 03 through 61.
c. Face split, multiple distributor arrangement for sizes 03 through 61.

3. Replaceable nozzle, brass refrigerant distributors and seamless copper distribution tubes are supplied to ensure uniform flow.

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 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.

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.

2.2 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.

2.3 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 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.

2.4 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.

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 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.

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.

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 and refrigerant piping shall be insulated with 1/2” Imcosheild un-split polyolefin insulation.

L. 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.

M. Insulated Covers for Pumps: 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 covered with 2” thickness insulation.

B. Insulation shall be Armacell Armaflex closed cell foam insulation or approved qual.

C. Refrigerant piping shall be insulated with 1/2” Imcosheild un-split polyolefin insulation.

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 work in this section. Submit shop drawings for checking and approval.

Subcontractor must familiarize himself with the terms of the above documents.

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/DDC system of temperature controls as manufactured by Andover Controls, Johnson Controls**,** or School District standardized 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. This 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. This Contractor shall be responsible for the integration of all new equipment (including, condensing units, VRF systems, etc.) into the ATC system for seamless operation. HVAC Contractor shall include factory controls with appropriate protocol (BACnet, LonMark, etc.) to allow integration with the ATC system.

D. 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.

E. RS-232 Drivers or Hardware Translators: All DDC components shall communicate on existing Level 1 or Level 2 networks in native mode.

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.

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 panel. This central panel will allow for time clock scheduling, setpoints, monitoring of points and alarm. All freeze-stats will be reset manually at the central panel. All alarms will be displayed and reset manually at central panel.

B. Central control panel shall be connected to existing District IT Network.

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 new work 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 26 and Division 23, wiring requirements of Division 26 will prevail for work specified in Division 26.

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.

I. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140. Only glass fiber is acceptable, no plastic.

J. Fiber optic cable shall only be installed and terminated by an experienced contractor. The BAS contractor shall submit to the Engineer the name of the intended contractor of the fiber optic cable with his submittal documents.

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 120VAC 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.

9. Wire will not be allowed to run across telephone equipment areas.

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 tubing and 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. Identify all pneumatic tubing with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with As-Built Drawings.

3. 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.

4. Junction box covers will be marked to indicate that they are a part of the BAS system.

5. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with nameplates.

6. All I/O field devices inside FIP's shall be labeled.

E. Existing Controls: Existing controls which are to be reused must each be tested and calibrated for proper operation. Existing controls which are to be reused and are found to be defective requiring replacement, will be noted to the Owner. The Owner will be responsible for all material and labor costs associated with their repair.

F. 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.

G. Location

1. The location of sensors is per Mechanical and Architectural Drawings.

2. Space humidity or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.

3. 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.

4. 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

1. The Contractor will configure a minimum of 6 reports for the Owner as listed below:
   a. Central Plant Status Report
   b. Air Handler Status Report
   c. Energy Consumption Report
   d. Space Temperature Report
   e. Specialty Equipment Status Report

E. Documentation

1. As-built software documentation will include the following:
   a. Descriptive point lists
   b. Application program listing
   c. Application programs with comments
   d. Printouts of all reports
   c. Alarm list
   d. 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. Indoor Energy Recovery Ventilation Unit (ERV-1)

1. Point List

a. Supply Fan (Speed & Status)
b. Exhaust Fan (Speed & Status)
c. Energy Recovery Wheel (Speed & Status)
d. OA, EA, Air Temperatures
e. OA, EA, Damper
f. Discharge Air Temperature
g. Hot Water Heating Coil Valves Modulation
h. VRF D/X Heating/Cooling Coil Status
i. Respective VRF Outdoor Unit Status
j. Dirty Filter Status
k. Cabinet Heater Valve Modulation
l. Freeze-Stat
m. Space Temperature
n. Space Temperature Setpoint

2. Sequence of Operation

a. Unoccupied - In this mode:
Supply and Exhaust fans off, OA and EA dampers closed, Cabinet Heater shall be Stage 1. If additional heat is required, the respective VRF cassette unit(s) shall start and run as stage 2 to maintain the night setback temperature (60°F). The respective outdoor VRF unit shall operate as required.

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. In heating mode, the hot water coil shall modulate as require to maintain occupied heating discharge set point as sensed by duct discharge temperature sensor. The Cabinet Heater shall be Stage 1, to maintain the occupied heating space temperature setpoint. If additional heat is required, the respective VRF cassette unit(s) shall start and run as stage 2. In cooling mode, the D/X coil and the respective outdoor VRF unit shall operate as required to maintain occupied cooling discharge setpoint as sensed by the duct discharge temperature sensor. The VRF cassette unit(s), shall start and run to maintain the occupied cooling space temperature set point.

iii. An adjustable dead band offset will prevent short cycling.

c. Alarms: In this mode:

i. The freeze-stat mounted after the hot water coils shall protect the water coils from freezing. Should the freeze-stat go into alarm the supply, return and exhaust fans shall shut off. The OA and EA dampers shall close. The hot water coil valves shall open. An alarm shall be generated at the operators work station. Note: The freeze-stat will be able to be reset from the operator's work station.

ii. If the command does not equal the status with 90 seconds from the start-up an alarm shall 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 workstation.

d. Economizer:

i. This mode is determined by a differential enthalpy calculation. When in this mode, ERU wheel shall stop, mechanical cooling shall stop, and Economizer system enabled.

B. Indoor Energy Recovery Ventilation Unit (ERV-2)

1. Point List

a. Supply Fan (Speed & Status)
b. Exhaust Fan (Speed & Status)
c. Energy Recovery Wheel (Speed & Status)
d. OA, EA, Air Temperatures
e. OA, EA, Damper
f. Discharge Air Temperature
g. Hot Water Heating Coil Valves Modulation
h. VRF D/X Heating/Cooling Coil Status
i. Respective VRF Outdoor Unit Status
j. Dirty Filter Status

k. Perimeter radiation valve modulation
l. Freeze-Stat
m. Space Temperature
n. Space Temperature Setpoint
o. Kitchen Hood Exhaust Fan Status

2. Sequence of Operation

a. Unoccupied - In this mode:
Supply and Exhaust fans off, OA and EA dampers closed, perimeter heat shall be stage 1. If additional heat is required, the respective VRF cassette unit(s) shall start and run as stage 2 to maintain the night setback temperature (60°F). The respective outdoor VRF unit shall operate as required.

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. In heating mode, the hot water coil shall modulate as require to maintain occupied heating discharge set point as sensed by duct discharge temperature sensor. Perimeter heat shall be stage 1, to maintain occupied heating space setpoint temperature. If additional heat is required, the respective VRF cassette units(s) shall start and run as stage 2. In cooling mode, the D/X Coil and respective outdoor VRF unit shall operate as required to maintain occupied cooling discharge setpoint as sensed by the duct discharge temperature sensor. VRF fan coil unit(s) and their respective VRF outdoor unit shall energize and modulate as required to maintain to maintain occupied cooling space set point temperature.
iii. An adjustable dead band offset will prevent short cycling.

c. Alarms: In this mode:
i. The freeze-stat mounted after the hot water coils shall protect the water coils from freezing. Should the freeze-stat go into alarm the supply, return and exhaust fans shall shut off. The OA and EA dampers shall close. The hot water coil valves shall open. An alarm shall be generated at the operators work station. Note: The freeze-stat will be able to be reset from the operator's work station.
ii. If the command does not equal the status with 90 seconds from the start-up an alarm shall 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 workstation.

d. Economizer:
   i. This mode is determined by a differential enthalpy calculation. When in this mode, ERU wheel shall stop, mechanical cooling shall stop, and Economizer system enabled.

e. Kitchen Hood Make-Up Air:
   i. Kitchen hood exhaust fan shall be interlocked with this unit. Whenever hood exhaust fan is energized, the ERV exhaust fan and recovery wheel shall stop.

C. Roof Mounted Energy Recovery Ventilation Unit (ERV-3)

1. Point List

   a. Supply Fan (Speed & Status)
   b. Exhaust Fan (Speed & Status)
   c. Energy Recovery Wheel (Speed & Status)
   d. OA, EA, Air Temperatures
   e. OA, EA, Damper
   f. Discharge Air Temperature
   g. Hot Water Heating Coil Valves Modulation
   h. VRF D/X Heating/Cooling Coil Status
   i. Respective VRF Outdoor Unit Status
   j. Dirty Filter Status
   k. Freeze-Stat
   l. Space Temperature
   m. Space Temperature Setpoint

2. Sequence of Operation

   a. Unoccupied - In this mode:
   Supply and Exhaust fans off, OA and EA dampers closed, VRF unit(s) shall start and run as stage 1 to maintain the night setback temperature (60°F). The respective outdoor VRF unit shall operate as required.

   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. In heating mode, the hot water coil shall modulate as require to maintain occupied heating discharge set point as sensed by duct discharge temperature sensor. In cooling mode, the D/X Coil and respective outdoor VRF unit shall operate as required to maintain occupied cooling discharge setpoint as sensed by the duct discharge temperature sensor. VRF fan coil unit(s) and their respective VRF outdoor unit shall energize and modulate as required to maintain to maintain occupied heating and cooling space set point temperature.

iii. An adjustable dead band offset will prevent short cycling.

c. Alarms: In this mode:
   i. The freeze-stat mounted after the hot water coils shall protect the water coils from freezing. Should the freeze-stat go into alarm the supply, return and exhaust fans shall shut off. The OA and EA dampers shall close. The hot water coil valves shall open. An alarm shall be generated at the operators work station. Note: The freeze-stat will be able to be reset from the operator's work station.
   ii. If the command does not equal the status with 90 seconds from the start-up an alarm shall 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 workstation.

d. Economizer:
   i. This mode is determined by a differential enthalpy calculation. When in this mode, ERU wheel shall stop, mechanical cooling shall stop, and Economizer system enabled.

D. Split Rooftop Dedicated Outdoor Air System Unit (DOAS-1)

1. Point List

   a. Supply Fan (Speed & Status)
   b. Exhaust Fan (Speed & Status)
   c. Energy Recovery Wheel (Speed & Status)
   d. OA, EA, Air Temperatures
   e. OA, EA, Damper
   f. Discharge Air Temperature
   g. VRF D/X Heating/Cooling Coil Status
   h. Respective VRF Outdoor Unit Status
   i. Dirty Filter Status
   j. Space Temperature
   k. Space Temperature Setpoint

2. Sequence of Operation

   a. Unoccupied - In this mode:
   Supply and Exhaust fans off, OA and EA dampers closed, VRF cassette unit(s) shall start and run to maintain the night setback temperature (60°F). The respective outdoor VRF unit shall operate as required.
   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. In heating mode, the D/X coil and respective outdoor VRF unit shall operate as required to maintain occupied heating discharge set point as sensed by duct discharge temperature sensor. The respective VRF cassette units(s) shall start and run to maintain occupied heating space setpoint temperature. In cooling mode, the D/X Coil and respective outdoor VRF unit shall operate as required to maintain occupied cooling discharge setpoint as sensed by the duct discharge temperature sensor. VRF fan coil unit(s) and their respective VRF outdoor unit shall energize and modulate as required to maintain to maintain occupied cooling space set point temperature.

iii. An adjustable dead band offset will prevent short cycling.

c. Alarms: In this mode:

i. If the command does not equal the status with 90 seconds from the start-up an alarm shall be generated at the operator's work station.

ii. Should any temperature fall outside of its preset limits (high/low) an alarm will be generated at the operator's workstation.

d. Economizer:

i. This mode is determined by a differential enthalpy calculation. When in this mode, ERU wheel shall stop, mechanical cooling shall stop, and Economizer system enabled.

E. Packaged Rooftop Units (RTU-1)

1. Point List
   a. Supply Fan VFD (Speed and Status)
   b. Exhaust Fan (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. OA, EA, RA Damper Modulation
   h. Discharge Temperature
   i. Hot Water Coil Valve Modulation
   j. DX Cooling Start/Stop/Status

2. Sequence of Operation

   a. Unoccupied: In this mode:
   Exhaust fans off, OA and EA dampers closed, recirculation damper open, supply fan shall start and hot water coil shall modulate as required to maintain night setback temperature 60°F (adjustable).

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 and EA dampers will remain closed, and thru a hard wired interlock the supply fan will start. Fan will slowly ramp up to preset speed. The warm-up program will reset the heating supply air temperature setpoint to 80°F (adj.). The hot water coil 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 unit will be controlled as described in the occupied mode.

c. Occupied: The OA and EA dampers will open, recirculation damper shall open to minimum position, RA damper shall open;

i. Supply, OA, and exhaust fans will start and ramp up slowly to their preset speed. The exhaust fan shall match the required outdoor air quantity.

ii. In heating mode, the hot water coil will modulate as needed to maintain occupied heating setpoint (adjustable).

iii. In cooling mode, the D/X cooling will modulate as needed to maintain occupied cooling setpoint (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.

d. Economizer Mode: In this mode:

i. This mode will be determined by a differential enthalpy calculation.

ii. When in this mode, the OA and EA dampers will open and the return air damper will close. This will be the first stage of Cooling.

iii. Should additional cooling be required, the DX cooling shall be sequenced/modulated as needed.

iv. Note: the energy recovery wheel will be off during economizer mode when the unit is on.

e. 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 work station.

F. Unit Ventilators (UV-A, UV-B)

1. Point List

a. Space Temperature
b. Discharge Air Temperature
c. Freezestat Status
d. Fan Start/Stop
e. Fan Status
f. OA/RA Damper Modulation
g. Face and Bypass Damper Modulation
h. Radiation Valve Modulation
i. D/X Cooling Coil Status
j. Respective VRF Outdoor Unit Status
k. Occupancy Sensor

2. Sequence of Operation

a. Unoccupied Mode: The outside air damper shall be closed, the return damper shall be open and the F&B damper shall be in full-face position. The radiation valve shall modulate to maintain night setback setpoint. Should the radiation alone fail to maintain the setpoint, the unit fan shall be energized. Exhaust fan shall be de-energized.

b. Occupied Mode: Unit fan and exhaust fan shall run continuously. During morning warm-up mode (room temperature more than 2 degrees below daytime setpoint), outside air damper shall be closed. Morning warm-up shall be scheduled to occur prior to space occupancy. As room temperature rises, outside air damper shall modulate to minimum position. Should room temperature continue to rise past setpoint, radiation valve shall modulate closed, F&B damper shall modulate to full bypass and then outside air damper shall modulate further open to provide free cooling (based on differential enthalpy). As room temperature decreases the reverse shall occur. A freezestat shall stop fan, close outside air damper and place F&B damper in full bypass position.

c. During the occupied mode, should the room lighting occupancy sensor detect “no occupancy” the unit shall revert to the unoccupied mode except that the room temperature setpoint shall be 2 degrees lower than the occupied setting.

d. Additional Information for UVAC Operation

i. The mechanical cooling cycle shall be locked out whenever the outdoor air temperature is 58 degrees F or below (adjustable) and cooling shall be provided by modulating the outdoor air damper as

required. Whenever the outdoor air temperature is between 59 degrees F and 70 degrees F the control cycle shall continue to use outdoor air for required cooling. Above 70 degrees F (adjustable) mechanical cooling shall be energized with the outdoor air damper being in the minimum position. Prior to mechanical cooling being energized the hot water coil end-of-cycle valve shall close and the F&BP damper shall be driven to the full face position.

ii. A 6 degree deadband shall prevent continuous compressor cycling.

G. VRF System Indoor Fan Coil Units

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. Energy Recovery Unit Status
g. Baseboard Fin Tube/Cabinet Heater 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 (if applicable) shall operate as Stage 1 heating. Room VRF Indoor Fan Coil Unit(s) and Outdoor Unit(s) 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 and factory thermostat to maintain thermostat setpoint. Baseboard radiation/cabinet heater shall operate as Stage 1 heating (if applicable). Room VRF Indoor Fan Coil Unit(s) Outdoor Unit(s) shall operate as Stage 2 as required to maintain space thermostat setpoint. Unoccupied/Occupied scheduling will be via BMS.

3.2 TRAINING

A. Provide start-up supervision, complete with all programming and instructions for use to the Owners/operators of the system.

B. Instructions to Owner's Staff

1. The Contractor shall include in his bid price the cost of providing appropriate training in the operation, adjustment and maintenance, including safety requirements, of the specified Automatic Temperature Control System (ATCS) as outlined below. Training shall be provided by knowledgeable instructors and shall be tailored towards the specific needs and installed system of the site. It shall not be a generic (canned) course. All instructors shall be thoroughly familiar with all aspects of the subject matter to be taught. All equipment and material required for classroom training, including printed matter, shall be provided by the Contractor.

C. Training Program

1. The training program shall be accomplished in three (3) phases for the time interval specified for each phase. A training day is defined as eight (8) hours of instruction including two 15-minute breaks and excluding lunchtime.

2. Training room should be clean, well-lit, well-ventilated and isolated from noise and other distractions (including HVAC noise). Ideally, the lights should be controllable to permit adequate contrast on any projection screen yet provide students with enough lighting to take notes.

3. Instructor should use a LCD screen or other device to project large images of software or other training images. Students should have their own computers on which to work; no computer should be used by more than two students.

4. Printed training materials should be tailored to the task at hand and should be well illustrated. Materials should take students through the steps of learning the ATCS and its software and should provide sample exercises students to perform on their classroom computers. All printed materials shall be presented to Owner for prior review and approval at least two weeks before the training begins. A full set of printed materials shall be made available for each student, plus two extra sets for the Owner.

5. If the ATCS or its software requires knowledge about HVAC, the use of a computer (or a mouse, Windows, etc.) or other technical information, these requirements should be spelled out to the Owner far enough in advance for students to take pre-training in these areas.

6. Training should steer clear of jargon and other confusing terminology and focus instead on learning how to use the system. Specific jargon can be addressed after the students have gained reasonable facility with the system.

7. All ATCS training should include a “hands-on” component that permits the students to see the hardware in place and watch the software in action.

8. Training should include quizzes and test that compel students to demonstrate understanding of the training’s most important concepts. Students who “fail” these tests should be assisted, by the instructor and other students, in trying again until they achieve a basic level of understanding.

9. Training should involve actual equipment using a training demonstration package that simulates real-time temperatures, settings and alarms.

10. The overall training approach should be interactive, encouraging students to discuss concepts and issues and share experiences.

11. Phase I

    a. This phase will be for a period of two (2) days prior to the acceptance test period at a time mutually agreeable the Contractor and the Owner. Operating personnel will be trained in the basic functions of the installed system, the procedures for system operation and the maintenance of ATCS hardware.

    b. The first day shall include:

        i. Overall structure of the system.
        ii. Logging on and off the system.
        iii. Developing point legs.
        iv. Executing commands.
        v. Generating reports.
        vi. Using trending capabilities.
        vii. Using alarm capabilities.
        viii. Working with graphics.
        ix. Hardware function and identification.
        x. Input function and identification.

    c. The second day of training shall include:

        i. Review of first day.
        ii. Hardware access and software manipulation.
        iii. ATCS troubleshooting.
        iv. ATCS preventative maintenance.
        v. Sensor maintenance and calibration.

12. Phase II

    a. This phase of training shall be conducted approximately four (4) weeks after system acceptance testing for a period of two (2) days. The first day of training will be condensed review of the entire first phase subject material. The second day will be based upon subject matter proposed by Owner personnel. One week prior to the date of the first Phase II training session, the Owner shall submit to the Contractor a detailed list of subject matter, which shall determine the content of the program (e.g. system software operational problems, software utilization, capability and usage, etc.).

13. Phase III

    a. Provide a third phase of training after the completion of one heating and cooling season. The particulars of this phase of training will be similar to that of Phase II.

    b. Three (3) neatly bound vinyl notebooks shall be provided by the Contractor containing a summary of each topic discussed during the three phase of training. Each training session shall be video-taped by a professional videographic representative.

14. A factory representative shall witness the final system test and then certify with an affidavit that the system is installed in accordance with the Contract Documents and is operating properly.

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. Overcurrent protective devices.
2. Panelboards.
3. 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. Removal of existing utility transformer along with the associated incoming and outgoing cables.

3. Installation of a new utility pad mounted transformer lineup (provide platform) for Elementary Schools.

4. Furnishing and installing new Utility pad transformer line up(provide platform for Middle School.

5. Installation of new service cables in underground ductbank.

6. Installation on new medium voltage cables in underground ductbank, supplying the new utility stepdown transformer from the last utility pole.

7. 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.

8. New electrical service as indicated on drawings.

9. Modifications to existing electrical distribution system as indicated on the Drawings.

10. Service switchboards, distribution panelboard, circuit breaker panelboards, feeder, conduit, cables and branch circuit wiring with all connections complete.

11. Conduit, conduit fittings, junction and pull boxes and all appurtenances necessary for the raceway systems including necessary supports and fasteners.

12. Electrical conductors, connectors, fittings and connection lugs.

13. Branch circuit devices, outlet boxes, pull boxes, motor disconnect switches, etc.

14. Power wiring to HVAC equipment including disconnect switches as shown and/or required by NEC.

15. Temporary electric power while existing electrical service is being removed until the new electrical service is being installed.

16. Core drilled holes for conduit passing through walls, ceilings and floors.

17. All necessary cutting, patching and core drilling incidental to the electrical work.

18. Licenses, permits, inspection and approvals.

19. Grounding as required as per NEC.

20. Sleeves for conduit and watertight caulking between conduit and sleeve.

21. Testing.

22. Cutting, patching and drilling.

23. Excavation and backfill by others. Sand bedding by Electrical Contractor.

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.	Motion Sensors	Watt Stopper, Sensorswitch

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 260250 - DUCT BANK

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. PVC conduit.

B. Duct.

C. Manholes.

1.2 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.

B. ASTM A48 - Gray Iron Castings.

C. ASTM C857 - Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

D. ASTM C858 - Underground Precast Concrete Utility Structures.

E. ASTM C891 - Installation of Underground Precast Utility Structures.

F. ASTM C1037 - Inspection of Underground Precast Utility Structures.

G. IEEE C2 - National Electrical Safety Code.

H. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

I. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

J. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

K. NEMA TC 6 - PVC and ABS Plastic Utilities Duct for Underground Installation.

L. NEMA TC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

M. NEMA TC 10 - PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.

N. NEMA TC 14 - Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings.

O. NFPA 70 - National Electrical Code.

P. UL 651A - Type EB and A PVC Conduit and HDPE Conduit.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience, and with service facilities within 100 miles of Project.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc.

1.5 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

B. Verify routing and termination locations of duct bank prior to excavation for rough-in.

C. Verify locations of manholes prior to excavating for installation.

D. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system.

E. Manhole locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete ductbank system.

PART 2 - PRODUCTS

2.1 PVC CONDUIT

A. Manufacturers:

1. Carlon.

B. Rigid Plastic Conduit: NEMA TC 2, Schedule 40 PVC, with fittings and conduit bodies to NEMA TC 3.

C. Rigid Plastic Underground Conduit: UL 651A, Type A PVC High-density polyethylene, Schedule 40.

2.2 PRECAST CONCRETE MANHOLES

A. Manufacturers:

1. A.C. Miller or equal.

B. Description: Precast manhole designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

C. Loading: ASTM C857, Class A-16.

D. Shape: Rectangular with truncated corners.

E. Nominal Inside Dimensions: 10 feet x 6 feet.

F. Corner Panel Dimensions: 3 feet wide.

G. Inside Depth: 6 feet.

H. Wall Thickness: 6 inches.

I. Base Section: Include 3 inches deep x 14 inches round sump with cast sleeve, and two 1 inch ground rod openings. Provide 4 inches diameter hole in bottom of manhole.

J. Top Section: Include 39 inches diameter grooved opening for frame and cover.

K. Riser Casting: 12 inches with manhole step cast into frame.

L. Frames and Covers: ASTM A48; Class 30B gray cast iron, 30 inches size, machine finished with flat bearing surfaces. Provide cover marked ELECTRIC OR TELEPHONE.

M. Duct Entry Provisions: Window knockouts.

N. Duct Entry Locations: As indicated.

O. Duct Entry Size: 6 inches.

P. Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Provide watertight seal.

Q. Cable Rack Inserts: Minimum load rating of 800 pounds. Locate on center.

R. Cable Rack Mounting Channel: 1-1/2 x 3/4 inch steel channel, 48 inch length. Provide cable rack arm mounting slots on 1-1/2 inch centers.

S. Cable Racks: Steel channel, 1-1/2 x 3/4 x 14 inches, with fastener to match mounting channel.

T. Cable Supports: Porcelain clamps and saddles.

U. Manhole Steps: Cast steps at 12 inches on center vertically.

V. Sump Covers: ASTM A48; Class 30B gray cast iron.

W. Source Quality Control: Inspect manholes in accordance with ASTM C1037.

2.3 ACCESSORIES

A. Underground Warning Tape: 4 inch wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

B. Install a 6" deep bed of 3/4" crushed stone under each manhole.

2.4 CAST-IN-PLACE MANHOLE ACCESSORIES

A. Sump Covers: ASTM A48; Class 30B gray cast iron.

PART 3 - EXECUTION

3.1 DUCT BANK INSTALLATION

A. Install duct to locate top of ductbank at depths as indicated on drawings.

B. Install duct with minimum slope of 4 inches per 100 feet. Slope duct away from building entrances.

C. Cut duct square using saw or pipe cutter; de-burr cut ends.

D. Insert duct to shoulder of fittings; fasten securely.

E. Join nonmetallic duct using adhesive as recommended by manufacturer.

F. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

G. Install no more than equivalent of three 90-degree bends between pull points.

H. Provide suitable fittings to accommodate expansion and deflection where required.

I. Terminate duct at manhole entries using end bell.

J. Stagger duct joints vertically in concrete encasement 3 inches minimum.

K. Use suitable separators and chairs installed not greater than 5 feet on centers.

L. Band ducts together before placing concrete.

M. Securely anchor duct to prevent movement during concrete placement.

N. Place 3000 p.s.i. concrete around PVC conduits. Use mineral pigment to color concrete red.

O. Provide minimum 3” concrete cover at bottom, top, and sides of ductbank.

P. Provide two (2) No. 4 steel reinforcing bars in top of bank under paved areas.

Q. Connect to manhole wall using dowels.

R. Provide 2 at pull rope in each empty duct except sleeves and nipples.

S. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

T. Backfill trenches with clean tamped soil.

U. Interface installation of underground warning tape with backfilling. Install tape 6 inches below finished surface.

3.2 PRE-CAST MANHOLE INSTALLATION

A. Excavate for manhole installation.

B. Install and seal precast sections in accordance with ASTM C891.

C. Install manholes plumb.

D. Use precast neck and shaft sections to bring manhole cover to finished elevation.

E. Attach cable racks to inserts after manhole installation is complete.

F. Install 4" diameter drains in manholes and connect to site drainage system 4 inch pipe terminating in 1/3 cu yd crushed gravel bed.

G. Damp-proof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days.

H. Backfill manhole excavation.

END OF SECTION 260250

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 260450.

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.

3.4 FLOOR BOX INSTALLATION

A. Set boxes level and flush with finish flooring material.

B. Use cast iron floor boxes for installation in slab on grade.

END OF SECTION 230350

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:

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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 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.

1.5 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.

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 260725 - DISTRIBUTION SWITCHBOARD

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, vendors and the like shall meet all Con Edison requirements.

1.2 SUMMARY

A. Work of this section shall be governed by the contract documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this section as shown on the drawings, as specified herein and/or as required by job conditions.

B. The work shall include, but not be limited to, indoor, low voltage switchboards of the circuit breaker, front accessible only, rear aligned, groove mounted type, as shown on the drawings and specified herein.

1.3 REFERENCES

A. Related Work Specified Elsewhere

1. General Conditions: Section 26 0100
2. Overcurrent Protective Devices: Section 26 0320

1.4 INTENT AND CODES

A. This specification describes the equipment required. It does not cover all phases of manufacture or assembly. Supplier shall assume the responsibility for providing well-integrated units of good quality.

B. All codes, rules, regulations and ordinances governing this work, are as fully a part of this specification as if herein repeated or hereto attached. Where the requirements of this specification are more stringent than any applicable codes etc., the specification shall apply.

1.5 MATERIAL AND WORKMANSHIP

A. Unless otherwise specified all materials shall be new. Supplier shall be responsible for defects in equipment and devices furnished but not manufactured by him. Exposed finishes and other features shall match in all respects. Supplier alone shall be responsible for all errors of fabrication and for correct fitting of all components that must be erected and joined in the field.

1.6 SHOP DRAWINGS

A. Complete shop drawings showing size and arrangement of equipment, foundation and anchor bolt requirements, bill of materials, performance data and curves, wiring and elementary diagrams, methods of assembly, connections to other work and other pertinent data as called for in the various parts of this Specification shall be furnished by the Supplier for checking and approval.

1.7 MAINTENANCE AND OPERATING INSTRUCTIONS

A. In addition to submittal for approval, furnish to the Owner's Representative six (6) copies of the items listed below for all equipment and material furnished under this specification.

B. Each approved shop drawing, including all final comments, shall be folded down so that it can be placed in a loose leaf binder of the size using standard 8-1/2" x 11" paper. The drawings shall be folded in a manner that they can be fully opened without removal from the binder.

C. Complete detailed parts lists and/or assembly drawings.

D. All governing agencies' and/or manufacturer's test certificates, permits and inspection reports, insurance inspection and all shop or field performance tests, when required.

E. All operating and maintenance manuals as required by this specification. Such manuals shall be edited to identify equipment furnished.

F. Approved catalog cuts and/or material lists as required by this specification.

G. The Manufacturer's Specification, including tabulation of sizes and identifying numbers for all installed material and equipment. The applicable items in each brochure shall be clearly defined and marked.

H. List of recommended spare parts.

I. All of the above items shall be assembled in books identified for units covered, including all assemblies and components. Each book shall contain Table of Contents page. Forward all the above information except for field test and/or field inspection reports to the Owner's Representative promptly after approval of shop drawings for each item and before delivery of any equipment involved.

1.8 INSPECTION AND SHOP TESTS

A. Materials and/or equipment covered by this specification shall be subject to inspection by the Owner. Owner's Representative shall, during working hours, have access to all parts of the shop where material to be used in this equipment is being manufactured and shall be provided with all reasonable inspection facilities. Release of material and/or equipment shall not relieve the Supplier from contract responsibilities nor invalidate any claim which the Owner may make because of unsatisfactory materials and/or construction.(If you put this in it means witness testing which is an expensive item. I would only do this for a job with extensive medium voltage and up equipment unless you want a road trip out of this. Same with B & C.)

B. Operational tests required by the Owner's Representative during inspection to demonstrate that equipment and components comply with the specification, shall be made by the Supplier. Tests shall be made with all removable elements in place unless otherwise permitted by the Owner's Representative.

C. Notify the Owner's Representatives of any scheduled test dates a minimum of one (1) week prior to factory test of equipment. All factory tests shall be witnessed by Owner's Representative unless otherwise directed and performance shall be complete to his satisfaction. A complete written report of tests specified herein shall be submitted promptly to the Owner's Representative

1.9 SHIPPING AND PROTECTION INSPECTION

A. All material, equipment and component parts shall be adequately protected to prevent damage, corrosion or entry of foreign matter during shipment, unheated storage or in a dusty atmosphere.

B. Each packing crate and carton containing components shall be visibly stenciled, clearly identifying contents as to the type(s) of unit(s) contained therein and the related equipment assembly or assemblies.

C. Each shipment shall contain packing slip listing all components.

D. For handling during shipment, lifting irons, eye bolts, or other lifting aids shall be bolted to the housing and shall not be removed until the equipment is in final position. The shipping sections may consist of completely assembled structures or sections of one or more units, as required to suit the handling facilities and to facilitate installation. Wiring that extends between sections to be terminated at accessible terminal blocks with wiring harnesses to facilitate field interconnections. Clearly identify all conductors and terminals.

1.10 SERVICE CONDITIONS

A. The material covered by this specification shall be designed for operation under conditions where the altitude does not exceed 3300 feet and the temperature of the cooling air does not exceed 40 Degrees C. maximum, 30 Degrees C. average, unless otherwise specified.

B. Construction shall conform to requirements for seismic restraints as specified in Section 26 0515.

1.11 GUARANTEE-WARRANTY

A. Guarantee that all equipment meets the design and performance requirements specified and alter and/or replace, at no costs to the Owner, any piece of equipment which fails to meet these requirements. This shall include any field work and factory trained supervision necessary.

B. All material included herein shall be free from defects and warranted for a period of 18 months from date of shipment of material from factory or 12 months from date of installation. Any parts found defective due to manufacture shall be replaced and reinstalled at no expense to the owner.

1.12 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.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Scope

1. This part of the Specification covers the basic equipment and detailed construction requirements, and the required shop drawings to be submitted fore the switchboard. All components, electric interconnections and accessories shall be designed and

constructed in accordance with the latest applicable standards as recommended by the American National Standards Institute (ANSI), the National Electrical Manufacturers' Association (NEMA), the Institute of Electrical and Electronics Engineers (IEEE), the Underwriter's Laboratory (UL) as well as the construction details specified herein. In case of conflict between the aforementioned Standards and this Specification, the more stringent requirement shall apply.

2. Applicable requirements of all Local Codes shall also be complied with.

3. Switchboards shall conform to the following standards:

   a. Underwriters Laboratories (UL) -
   UL 891 - "Dead Front Electrical Switchboards".
   Switchboards and its components shall be UL listed and labeled.

   b. National Electrical Manufacturers Association
   NEMA-PB2 - "Dead Front Distribution Switchboards".
   NEMA-PB2.1 - General Instructions for proper handling, installation, operation, and maintenance of dead front distribution switchboards rated 600 volts or less.

4. The general arrangements, limiting dimensions, type and/or ratings are shown on the drawings accompanying this Specification. The basic equipment and detailed construction requirements for the various components entering into individual switchboards, shall be in accordance with the applicable provisions of this part. Coordinate the requirements of the various Parts of this Specification with the drawings when ordering equipment or material in accordance with the applicable provisions of this Part.

2.2 REQUIRED SHOP DRAWINGS

A. Shop drawings shall be submitted as specified in Part 1 - General. As a minimum the following drawings shall be submitted for approval in accordance with the procedure indicated, falling into two categories.

B. Drawings for Preliminary Approval to enable Supplier to proceed with equipment ordering and scheduling of fabrication:

1. Front elevation, one line diagram showing main and branch circuit breaker ratings and types and any information required for complete identification and location of major equipment items, including dimension outline sizes, weights, shipping splits, and arrangement of all equipment.
2. Voltage, phase, frequency, horizontal and vertical bus capacities, short circuit ratings.

3. Floor plan and top view showing materials, sizes, anchoring, location of power and control conduit, and ground cable entries above and below.

4. Preliminary Bill of Material or switchboard summary showing all major components.

5. Preliminary schematic diagrams of nonstandard circuits.

C. Detailed Engineering Drawings supplied to Owner promptly after approval of preliminary drawings.

1. Wiring and schematic diagrams of all power circuits. Wiring diagrams shall be separate from schematic diagrams and shall show equipment arrangement, terminal numbers and point-to-point wiring of each piece of equipment and terminal block. Interconnection wiring diagram shall be furnished, showing general physical arrangement of all units and terminal blocks used in wiring between such units. The separate schematic diagrams shall include complete three line diagrams for buses, low-voltage switch and fuse units and any other devices in this Switchboard.

2. Complete Bill of Material, or switchboard summary showing all components and materials, clearly describing same and providing numbers and data for checking.

3. Detailed sections through all frames showing equipment, buswork, bus phasing connections and ground stud assembly on bus.

4. Detailed drawings showing provision for main and feeder bus extension and bus risers and indication of short circuit bracing.

5. Handling, installation and assembly drawing.

6. Final dimensioned outline drawings and accessories, phasing, location of jacking points, etc.

7. Device connection diagrams.

8. Nameplate data sheets.

9. Cable lug type, quantities and sizes.

10. Operating and maintenance instruction manuals for all types of equipment.

2.3 LIMITING DIMENSIONS

A. The dimensions indicated on the drawings are limiting and the orientation of the equipment shall be maintained. If a particular manufacturer's equipment exceeds any of the dimensions shown, it should be clearly stated in his proposal. The Owner will evaluate the cost of accommodating this equipment in the building design when reviewing his bid.

2.4 600 CLASS METAL-ENCLOSED SWITCHBOARD

A. General

1. Switchboard shall be indoor, free-standing, bolt-on circuit breaker type, group mounted, front accessible only, front and rear aligned and suitable for mounting against a wall, complete with all disconnects and accessories as shown on the drawings and specified herein.

2. Switchboards and buswork shall be fabricated to permit future expansion.

3. Where spaces for future circuit breaker units are shown, provide all current carrying components and covers, ready to receive the future units.

4. Provide nameplates for all units.

B. Enclosure

1. The entire assembly shall be totally metal enclosed, of indoor construction unless otherwise noted. Enclosures shall be fabricated of code gauge steel, formed and framed for rigidity. Fixed panels and framework shall be of bolted construction. Assembly shall be 90 inches high unless conditions require otherwise.

2. Cable compartments shall have adequate space for cables as required. Provide cable supports for each vertical section.

3. Housing shall be thoroughly cleaned and degreased after fabrication, bonderized and primed with zinc chromate. Finish shall be two coats of gray enamel, ANSI #61.

C. Buswork

1. Buswork shall be 3-phase, 4-wire fabricated of copper, tin or silver plated throughout extending the entire length of the assembly, ampere rating as shown on the drawings.

2. Main buswork shall have full capacity throughout the entire length of the switchboard. Vertical buswork shall be equal in size to the sum of the switch sizes in the vertical section including spares and spaces with a maximum size equal to

that of the main bus. Bus extensions to feeder switches and from the load side of the switches to the cable compartment shall be equal to the size of the switch. The continuous current ratings of the busses shall be determined by temperature rise as limited by ANSI standards and the National Electrical Code. Neutral bus shall be full sized, rating scale as the phase busses.

3. Provide an A-B-C bus arrangement, left to right, top to bottom, front to back, throughout as viewed from the front of the switchboard.

4. Buswork shall be braced and supported to safely withstand short circuit stresses equal to the full available fault currents at the switchboard, minimum 100,000 AIC ampere RMS symmetrical.

5. Provide two-hole long barrel compression cable connectors for cable as indicated per phase, neutral and ground on all incoming conductors.

6. Provide bus tap lugs for connection of transient voltage surge suppressors as close to incoming conductors as possible.

7. Ground bus shall be rated 25 percent of the phase busses with minimum size of 3 inches by 1/4 inch and be continuous for the entire length of the switchboard. Ground bus shall be accessible from the front of the switchboard. Ground bus shall be copper.

D. Circuit Breaker - Provide thermal magnetic circuit breakers with interrupting capacity as shown on the Drawing. Where indicated on distribution schedule on drawing, provide circuit breakers with electronic trip units.

E. Accessories

1. The following accessories shall be furnished with each switchboard.
   a. One (1) quart of touchup paint.
   b. One set of special wrenches, removable hand cranks, tools as required to maintain and disassemble parts of the switchgear for field maintenance.

F. Approved Manufactures

1. The 600 volt class metal-enclosed switchboard shall be the product of one of the following approved manufactures:
   a. General Electric Company - AV5
   b. Square D I-line Switchboard
   c. Eaton/Cutler Hammer Electric Corporation - POW-R-Line C, or equal.

PART 3 - EXECUTION

3.1 SHIPMENT

A. Prior to shipment, all equipment shall be cleaned. All openings shall be covered to prevent entrance of foreign material. Where necessary, desiccant bags shall be located within cabinets to provide a minimum of 3 months protection.

B. Equipment shall be shipped in sections to facilitate installation, complete with all accessories required for assembly. All wiring that extends between sections shall terminate on terminal blocks at the interface points, with a wiring harness (with framing strips) that will be field installed between adjacent sections. All terminal and wires shall be clearly marked with wire numbers.

3.2 INSTALLATION

A. General: Install and connect switchboard equipment in accordance with approved manufacturer's shop drawings including supplemental devices required to make each unit a complete installation.

B. Switchboards shall be anchored to two (2) 3-inch channel sills set flush with the concrete housekeeping pad. Provide all required shims, etc., to achieve a level installation.

C. Mechanical Connections

1. Make all required connections including split line connections.

2. Remove shipping irons after equipment is set in place.

D. Electrical Connections

1. Bus connections: Use manufacturer's recommended torque.

2. Install control wiring connections at shipping splits and coordinate with SCADA requirements for Emergency Switchboards.

3. Provide holes in plates to allow for required conduit connections.

4. Terminate low voltage cables.

5. Ground conduits and cables as specified in Section 26 0200 and 26 0300.

6. Insulating Tape: When main buses are insulated or enclosed by barriers, insulate with tape wrappings all cable connections for voltage level involved so no current carrying parts are exposed.

7. Cable Blocks: support all outgoing secondary cables from cable blocks.

3.3 FIELD QUALITY CONTROL

A. Phase Sequence

1. Coordinate with the system supply for proper phase sequence throughout.

2. Provide phase sequence indicator on jobsite to verify all secondary outgoing feeder rotation.

B. Test all circuit breakers or fuses and switches for proper operation.

C. Bus Bar Connections

1. Check for proper resistance values using “Ducter” low resistance ohmmeter. Make adjustments where valves exceed manufacturer’s recommendations.

2. “Megger” phase bus bars to assure that no grounds or shorts are present. Disconnect potential and control transformers, instrument fuses and other equipment which may cause false readings.

D. Start-Up and Acceptance

1. Coordinate with equipment supplier and Owner for preparatory work required prior to energizing and acceptance and in accordance with Owner’s start-up procedures.

E. Contractor shall leave the entire installation in perfect working order.

END OF SECTION 260725

SECTION 260750 - ELECTRIC SERVICE

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 electric service system and to complete all work shown on the Drawings or specified herein.

1.2 WORK BY THIS CONTRACT

A. Furnish and install primary and secondary equipment as follows:

1. Furnish and install concrete equipment pads.

2. Furnish and install secondary cables and conduit from utility transformer to building switchgear.

3. Install utility service transformer.

4. Furnish and install primary cables and ducts to splice or connect to utility equipment as shown on Drawings per Utility Company specifications.

B. Coordinate all work with the utility company to insure timely completion of all work consistent with the schedule established by the Contractor.

1.3 WORK BY SITE CONTRACTOR

A. Furnish and install the following:

1. Furnish and install primary cables and conduit from utility company service end box to utility transformer including all terminations.

2. Ground electric service and transformer as required.

3. Install utility transformer.

4. Furnish and install secondary conduit from transformer to within five (5) feet of building.

1.4 WORK BY UTILITY COMPANY

A. Furnish and install the following:

1. Furnish service transformers.

B. Furnish and/or install the following:

1. Furnish primary switchgear.
2. Furnish service transformers and network protectors.
3. Furnish current transformers.
4. Final connection to all primary equipment.

1.5 REFERENCE TO OTHER SPECIFICATION SECTIONS

A. Raceways.

B. Wire and Cable.

C. Switchboards.

D. Grounding.

1.6 SUBMITTALS

A. Submit complete details of work as approved by the utility including components, routing and location.

1.7 QUALITY ASSURANCE

A. Utility Company Standards.

B. National Electrical Code (NEC).

C. Underwriters Laboratories, Inc. (UL).

1.8 WORK BY ELECTRICAL CONTRACTOR

A. Furnish and/or install secondary equipment as follows:

1. Furnish and install secondary cables from utility transformer to building switchgear.
2. Furnish and install secondary conduit from within 5 ft. of building to switchgear room.
3. Furnish and install final connections on secondary utility transformer and building switchgear.
4. Furnish and install meter pan, current transformers and cabinets.
5. Furnish and install meter wiring.
6. Furnish and install switchgear grounding and bonding.

B. Coordinate all work with the utility company and site work contractor to insure timely completion of all work consistent with the schedule established by the General Contractor.

1.9 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.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE CONDUIT

A. Furnish and install conduit and cable as indicated in 1.2 A above.

B. Conduit, fittings and accessories shall be in accordance with the “Raceways” section of this specification and concrete encased.

2.2 SERVICE ENTRANCE CONDUCTORS

A. Furnish and install service entrance conductors between the utility transformer and building service equipment.

B. Conductors shall be 600V, cable suitable for service entrance use. Cable type and installation shall be per the “Wire and Cable” section of this specification.

PART 3 - EXECUTION

3.1 COORDINATION

A. Before proceeding contact the utility company, to coordinate schedule of work by all trades effected by the work.

B. Obtain copies of all utility design and installation standards applicable to the work to be performed.

C. Obtain utility company approval for work to be performed.

3.2 INSTALLATION

A. Before installation, submit applicable shop drawings including necessary details for the use of other trades.

B. Should field conditions prevent installation as approved by the utility, obtain approval of deviations prior to installation.

3.3 RECORD DRAWINGS

A. At completion submit complete as-built drawings to the Owner and the utility company including all dimensions necessary to identify exact location of work installed.

3.4 ACTIVATION OF SERVICE

A. Upon completion of the installation, coordinate activation of the service with the utility company.

B. Supply necessary manpower and miscellaneous work to facilitate activation.

C. Advise all trades of time of activation and confirm that all equipment to be energized has been properly protected and is suitable to be placed into service.

END OF SECTION 260750

SECTION 260770 - SURGE SUPPRESSOR

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. This specification describes the mechanical and electrical requirements for a Surge Protection Device herein known and shown on all drawings as SPD. The SPD shall be suitable for application in category C High environments as described in ANSI/IEEE C62.41. The SPD shall be parallel in design and provide protection for the following modes: {Line to Neutral, Line to Ground, Line to Line, Neutral to Ground} for electrical distribution systems. “Series” type SPD units will be deemed unacceptable

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.

B. Product Certificates: For surge protection devices, signed by product manufacturer certifying compliance with the following standards:

1. UL 1283
2. UL 1449 3rd Edition

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer

B. Product Options: Drawings shall indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NEMA LS 1, “Low Voltage Surge Protection Devices”

E. Codes and Standards
1. UL compliance and Labeling: Listed per UL 1449 3rd Edition
2. UL 1283 “Electromagnetic Interference Filters”
3. Comply with ANSI/IEEE C62.1, C62.41, and C62.45
4. NEC compliance: Comply with NEC as applicable to construction and Article 280 for installation.

1.4 MANUFACTURERS QUALIFICATIONS

A. Only pre-approved SPD products shall be accepted

B. Manufacturer Qualifications: All SPD units shall be manufacturer by a firm that strictly manufactures SPD products only, for at least 10 years. Firms must also regularly engage in the manufacturing of SPD products for Categories B (ANSI/IEEE 62.41) and C High.

C. The SPD shall be warranted for no less than 15 years and shall include free replacement in whole or in part during those 15 years for any reason of failure.

1.5 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.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE SUPPRESSORS

A. General: The A.C. Voltage Surge Protective Devices shall be a high speed, high current solid-state device designed to protect electronic equipment and electrical systems from transient over voltages. It shall limit the magnitude of a transient overvoltage present on the AC service or distribution power lines. The suppressor shall provide continuous bi-polar, bi directional, non-interrupting protection and be capable of instant automatic reset with no degradation in protection capabilities. The suppressor shall be solid state, utilizing 40mm metal oxide arrestors (MOV's). Gas tubes are not acceptable. It shall start to suppress the transient at a minimum of 115% of the peak voltage of the sinewave. The suppressor assembly shall be installed in parallel of the service main disconnect, distribution or branch panel main lugs. Connect the suppressor to over current protection sized with an AIC rating equal to or greater than the panel rating. The suppressor shall be contained in an enclosure appropriate for the environmental application.

B. Electrical Performance

1. ANSI/IEEE Testing Minimum Requirements

	SVR UL 1449 2nd	VPR UL 1449 3rd	CAT B 6kV/3kA	CAT C High 20kV/10kA
480Y/277	800V	1200V	776V	904V
208Y/120	400V	700V	416V	528V

C. SPD specifics:

1. The surge protection device shall be permanently wired through an over current device (specific size shall be specified by the manufacturer) installed in the service entrance electrical equipment (rated with the same electrical characteristics of the panel) with leads as short as possible and not to exceed 18 inches.

2. Surge Protection Device Description - Modular Design with field replaceable modules and the following features and accessories:

   a. Fabrication using bolted compression lugs for internal wiring
   b. Replaceable bolt down modules per phase. The use of single “Brick” Module and/or “Plug In” type module designs will not be accepted.
   c. Arrangement with wire connections to phase buses, neutral bus, and ground bus
   d. A 200,000 AIC Fused Rotary Disconnect
   e. Remote Audio/ Visual Alarm Panel
   f. UL Listed 1283 Extended Power Range Filter
   g. Green/Red LED Indicator lights for power and protection status.
      Green = Power On / Protection Present Red = Failure
   h. Normally Open / Normally Closed Form C Dry Contacts
   i. Surge Event Counter

3. Peak Single-Impulse Surge Current Rating shall be 240kA per phase
4. Standard unit housings shall be 16 gauge painted steel and match the NEMA rating of the panel board.
5. Standard unit warranty must be for at least 15 years and be stated in the manufacturer’s literature.

D. Approved Manufacturers

1. Atlantic Scientific – ZoneMaster PRO Series or Equal. (contact Andy Topinka @ 862-210-8126)

2.2 DISTRIBUTION PANEL SUPPRESSORS

A. General: The A.C. Voltage Surge Protective Devices shall be a high speed, high current solid-state device designed to protect electronic equipment and electrical systems from

transient over voltages. It shall limit the magnitude of a transient overvoltage present on the AC service or distribution power lines. The suppressor shall provide continuous bi-polar, bi directional, non-interrupting protection and be capable of instant automatic reset with no degradation in protection capabilities. The suppressor shall be solid state, utilizing 40mm metal oxide arrestors (MOV's). Gas tubes are not acceptable. It shall start to suppress the transient at a minimum of 115% of the peak voltage of the sinewave. The suppressor assembly shall be installed in parallel of the service main disconnect, distribution or branch panel main lugs. Connect the suppressor to over current protection sized with an AIC rating equal to or greater than the panel rating. The suppressor shall be contained in an enclosure appropriate for the environmental application.

B. Electrical Performance

1. ANSI/IEEE Testing Minimum Requirements

	SVR UL 1449 2nd	VPR UL 1449 3rd	CAT B 6kV/3kA	CAT C High 20kV/10kA
480Y/277	700V	1000V	825V	950V
208Y/120	330V	600V	456V	550V

C. SPD specifics:

1. The surge protection device shall be permanently wired through an over current device (specific size shall be specified by the manufacturer) installed in the service entrance electrical equipment (rated with the same electrical characteristics of the panel) with leads as short as possible and not to exceed 18 inches.

2. Surge Protection Device Description - Modular Design with field replaceable modules and the following features and accessories:

   a. Fabrication using bolted compression lugs for internal wiring
   b. Replaceable bolt down modules per phase. The use of single "Brick" Module and/or "Plug In" type module designs will not be accepted.
   c. Arrangement with wire connections to phase buses, neutral bus, and ground bus
   d. UL Listed 1283 Extended Power Range Filter
   e. Green/Red LED Indicator lights for power and protection status.
      Green = Power On / Protection Present Red = Failure
   f. Normally Open / Normally Closed Form C Dry Contacts

3. Peak Single-Impulse Surge Current Rating shall be 100kA per phase.

4. Standard unit housings shall have a transparent front cover for complete visual inspection and monitoring the status of protection for each module, any onboard diagnostics, module configuration, and wiring configuration.

5. Standard unit housings shall be non-metallic and meet NEMA 1, 2, 3, 3S, 4, 4X, 12 and 13 classifications

6. Standard unit warranty must be for at least 15 years and be stated in the manufacturer's literature.

D. Approved Manufacturers

1. Atlantic Scientific Corporation – ZoneSentinel 100 Series or equal. (contact Andy Topinka @ 862-210-8126)

2.3 BRANCH PANEL SUPPRESSORS

A. General: The A.C. Voltage Surge Protective Devices shall be a high speed, high current solid-state device designed to protect electronic equipment and electrical systems from transient overvoltages. It shall limit the magnitude of a transient overvoltage present on the AC service or distribution power lines. The suppressor shall provide continuous bi-polar, bi directional, non-interrupting protection and be capable of instant automatic reset with no degradation in protection capabilities. The suppressor shall be solid state, utilizing metal oxide varistors (MOV's). Gas tubes are not acceptable. It shall start to suppress the transient at a minimum of 115% of the peak voltage of the sinewave. The suppressor assembly shall be installed in parallel of the service main disconnect, distribution or branch panel main lugs. Connect the suppressor to over current protection sized with an AIC rating equal to or greater than the panel rating. The suppressor shall be contained in an enclosure appropriate for the environmental application.

B. Electrical Performance

1. ANSI/IEEE Testing Minimum Requirements

	SVR UL 1449 2nd	VPR UL 1449 3rd	CAT B 6kV/3kA	CAT C High 20kV/10kA
480Y/277	800V	1000V	890V	1200V
208Y/120	400V	500V	435V	730V

C. Surge Protection Devices details:

1. The surge protection device shall be permanently wired through an overcurrent device (specific size shall be specified by the manufacturer) installed in the service entrance electrical equipment (rated with the same electrical characteristics of the panel) with leads trimmed as short as possible and not to exceed 18 inches.

2. Surge Protection Device Description - Non-Modular Design with the following features and accessories:

a. 200,000 AIC Fused
b. Built in Audible Alarm
c. UL Listed 1283 Extended Power Range Filter
d. Green/Red LED Indicator lights for power and protection status. Green = Power On / Protection Present Red = Failure
e. Normally Open / Normally Closed Form C Dry Contacts

3. Peak Single-Impulse Surge Current Rating shall be 80kA per phase
4. Standard unit housings shall be metallic in construction and meet NEMA 1,2,3,3S,4,4X,12, and 13 classifications
5. Standard unit warranty must be for at least 10 years and be stated in the manufacturer's literature.

D. Approved Manufacturers

1. Atlantic Scientific Corporation – ZoneDefender PRO Series or equal. (contact Andy Topinka @ 862-210-8126)

PART 3 - EXECUTION

3.1 APPLICATION OF SPD

A. General

1. Apply SPD on the load side of the first main disconnect at the electrical service entrance switchboard and on the load side of the main overcurrent device at the electrical distribution panelboard.

2. Coordinate system voltage, wiring configuration, and location as shown on project drawings.

3.2 INSTALLATION OF SPD

A. Service Entrance: Connect the SPD to a 60A Breaker with #6 AWG minimum conductors, #4 AWG maximum (for ease of dressing), to the Service Entrances panel being protected. The conductors are to be as short and straight as practically possible and shall not exceed 18 inches in length. The SPD shall be installed following the manufacturer's recommended practices and in compliance with all applicable codes.

B. Distribution Panels: Connect the SPD to a 60A or 30A (whichever is specified by the manufacturer for that model) with #8 AWG minimum conductors, #4 AWG maximum (for ease of dressing), to the Distribution panels being protected. The conductors are to be as short and straight as practically possible and shall not exceed 18 inches in length. The SPD shall be installed following the manufacturer's recommended practices and in compliance with all applicable codes.

C. Branch Panels: Install the SPD to with #10 AWG provided from the manufacturer to the Branch panels being protected. The conductors are to be kept as short and straight as practically possible and shall not exceed 18 inches in length that is provided. The SPD shall be installed following the manufacturer's recommended practices and in compliance with all applicable codes.

END OF SECTION 260770

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 323113 – CHAIN LINK FENCE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes fence framework, fabric, gates, steel posts and channels as shown on the Contract Drawings, complete with accessories.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)
   a. A90 Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles
   b. A121 Specification for Zinc-Coated (Galvanized) Steel Barbed Wire
   c. A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric
   d. A428 Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles
   e. A491 Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
   f. A569 Specification for Steel, Sheet and Strip, Carbon (0.15 Maximum Percent). Hot-Rolled, Commercial Quality
   g. A585 Specification for Aluminum-Coated Steel Barbed Wire
   h. A817 Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric
   i. A824 Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain-Link Fence
   j. B117 Method of Salt Spray (Fog) Testing
   k. C94 Ready-Mixed Concrete
   l. F567 Standard Practice for Installation of Chain-Link Fence
   m. F626 Specification for Fence Fittings
   n. F669 Standard Specification for Strength Requirements of Metal Posts and Rails
   o. F083 Standard Specification for Pipe, Steel and Hot Dipped Zinc Coated, Welded, for Fence Structures

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Manufacturers certification that all materials furnished are in compliance with the applicable requirements of the referenced standards and this specification.

B. Samples of any material shall be submitted at the Engineers request.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers are named to establish a standard of quality necessary for the Project.

1. Allied Tube & Conduit Corp.
2. Anchor Fence, Inc.
3. Page Aluminized Steel Corp.
4. Or equal

2.2 GENERAL

A. Framework: Type I or Type II Steel Pipe.

1. Type I - Schedule 40 steel pipe with 1.8 ounces of zinc coating per square foot of surface area conforming to Standard Specification ASTM F1083; or
2. Type II - pipe manufactured from steel conforming to ASTM A 569 or F 669, cold-formed, high frequency welded and having a minimum yield strength of 50,000 PSI. External surface triple coated with 1.0 ounce +- 0.1 ounce of zinc per square foot, 30 +- 15 micrograms of chromate per square inch and 0.5 +- 0.2 mils of clear, cross linked polyurethane. Internal surface coated, after welding, with a zinc-rich based organic coating having an 87% zinc powder loading capable of providing galvanic protection.
3. Pipe shall be straight, true to section and conform to the following weights:

Pipe Size Outside Diameter	**Type I Weight Lbs./Ft.**	**Type II Weight Lbs./Ft.**
1 5/8"	2.27	1.84
2"	2.72	2.28
2 1/2"	3.65	3.12
3"	5.79	4.64
3 1/2"	7.58	5.71
4"	9.11	6.56

4. Channel shall be Unistrut, model P1001A, 1 ⅝” x 3 ¼”, 12 ga. galvanized steel channel, or approved equal.

B. Fittings:

1. Pressed steel or cast iron, galvanized with a minimum of 1.2 ounces of zinc per square foot of surface area, or cast aluminum alloy, all conforming to ASTM F 626.

2.3 CONCRETE MIX

A. ASTM C 94 Portland Cement concrete with maximum 3/4" aggregate having a minimum compressive strength of 2,500 PSI at 28 days.

2.4 MATERIALS AND CONSTRUCTION

A. Fence Posts

1. Fence posts shall be sized as follows:

	Line Post O.D.		Terminal Post O.D.	
Fabric Height	**Type I**	**Type II**	**Type I**	**Type II**
Under 6'	2"	2"	3"	2 1/2"
6' to 9'	2 1/2"	2 1/2"	3"	3"
9' to 12'	3"	3"	4"	3 1/2"

B. Gate Mounting Posts

1. Gate mounting posts shall be sized as follows:

		Post O.D.	
Single Gate Width	**Double Gate Width**	**Type I**	**Type II**
Up to 6'	Up to 12’	4"	3”
7' to 12'	13' to 25'	4"	3.5"
13' to 18'	25' to 36'	6 5/8"	---

C. Rails and Braces

1. Rails and braces shall be 1 5/8" O.D., Type I or Type II.

D. Fabric

1. Fabric shall be black vinyl-coated steel wire, 9 gage, woven in a 2-inch diamond mesh with top knuckled selvage twisted and barbed and bottom selvage knuckled. Fence heights up to 12 feet shall be one-piece widths.

E. Gates

1. Gates shall have frame assembly of 2 inches O.D., Type I or Type II pipe with welded joints. Weld areas repaired with zinc-rich coating applied per manufacturer's directions. Fabric shall match fence. Gate accessories, hinges, latches, center stops, keepers and necessary hardware shall be of quality required for industrial and commercial application. Latches shall permit padlocking of gate.

F. Channels

1. Channel shall be Unistrut, model P1001A, 1 ⅝" x 3 ¼", 12 ga. galvanized steel channel, or approved equal.

G. Fittings

1. Post caps shall be pressed steel, cast iron or cast aluminum alloy designed to fit snugly over posts to exclude moisture. Supply cone type caps for terminal posts and loop type for line posts.
2. Rail and brace ends shall be pressed steel, cast iron or cast aluminum alloy, cup-shaped to receive rail and brace ends.
3. Top rail sleeves shall be tubular steel, 0.051 thickness by 7 inches long, expansion type.
4. Tension bars shall be steel strip, 5/8 inch wide by 3/16 inch thick.
5. Tension bands shall be pressed steel, 14 gage thickness by 2 inch wide.
6. Brace bands shall be pressed steel, 12 gage thickness by 2 inch wide.
7. Truss rods shall be steel rod, 3/8 inch diameter merchant quality with turnbuckle.
8. Channel mounting bolts shall be hot dip galvanized meeting ASTM F 1554, Grade 36, with nuts meeting ASTM A563 and flat washers.

H. Tension Wire

1. Tension wire shall be marcelled 7 gage steel wire with minimum coating of 0.80 ounces of zinc or 0.40 ounces of aluminum per square foot of wire surface and conforming to ASTM A 824.

I. Tie Wires

1. Tie wires shall be aluminum 9 gage, alloy 1100-H4, A58 self locking fabric bands or equal.

J. Hog Rings

1. Hog rings shall be steel wire, 11 gage with a minimum zinc coating of 0.80 ounces per square foot of wire surface.

PART 3 EXECUTION

3.1 INSTALLATION

A. Fence installation shall conform to requirements of ASTM F 567.

B. Provide fence heights as shown on Contract Drawings.

C. Space line posts at intervals not exceeding ten feet.

D. Set terminal, gate and line posts plumb in concrete footings as shown on Contract Drawings. Top of footing shall be 2 inches above grade and sloped to direct water away from posts.

E. Brace gate and terminal posts back to adjacent line posts with horizontal brace rails and diagonal truss rods.

F. Install top rail through line post loop caps connecting sections with sleeves to form a continuous rail between terminal posts. Fasten top rail to terminal posts.

G. Stretch bottom tension wire between terminal posts 6" above grade and fasten to outside of line posts with tie wires.

H. Pull fabric taut to provide a smooth uniform appearance, free from sag, with bottom selvage 2" above grade. Fasten to terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 18" intervals. Tie to line posts and top rails with tie wires spaced at maximum 14" on posts and 24" on rails. Attach to bottom tension wire with hog rings at maximum 24" intervals.

I. Install gates plumb, level and secure for full opening without interference. Anchor center stops and keepers in concrete. Adjust and lubricate hardware for smooth operation.

J. Install nuts for fittings, bands and hardware bolts on inside of fence. Peen ends of bolts or score threads to prevent removal.

End of Section

SECTION 323913 – MANUFACTURED METAL BOLLARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manufactured metal bollards.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete"

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of finish specified.

C. Shop Drawings: Indicate types, sizes, finishes, and anchorage details showing relationship with adjacent construction.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.

B. Protect stored materials from damage due to weather, excessive temperature, and construction operations.

C. Handle materials in accordance with manufacturer's recommendations.

1.6 WARRANTY

A. Material Warranty: Provide manufacturer's standard material warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products manufactured by the following OR EQUAL:

1. BollardsUSA.com, a division of J.R. Hoe, 101 Ironwood Road, Middlesboro, KY 40965. www.jrhoe.com.

B. Substitution Limitations: Comply with provisions of Division 01 Section for "SUBSTITUTION PROCEDURES."

2.2 MANUFACTURED METAL BOLLARDS

A. Bastion Series Bollard:

1. Material: Steel.
2. Top: Flat.
3. Neck Diameter: 8-5/8 inches.
4. Height: 36 inches.
5. Center: Plain.
6. Finish: Exterior powder coat.
7. Color: As selected by Architect from manufacturer's full range
8. Installation Method: Fixed.

2.3 MATERIALS

A. Steel and Iron: Free of surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A572, Grade 50.
2. Beams: ASTM A 992, Grade 50.
3. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53/A 53M, or electric-resistance-welded pipe complying with ASTM A 135/A 135M.
4. Tubing: Cold-formed steel tubing complying with ASTM A 500/A 500M, Grade B.
5. Gray-Iron Castings: ASTM A 48/A 48M, Class 30

2.4 ACCESSORIES

A. Fasteners: Manufacturer’s recommended noncorrosive fasteners.

B. Hardware for Fixed Mount Bollards: Stainless steel threaded rods, nuts, and washers.

2.5 FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

1. Salt Spray Resistance: 5,000 hours when tested per ASTM B117.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, 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 INSTALLATION

A. Install according to manufacturer's written instructions and details.

B. Install bollards plumb and securely anchored at locations indicated on Drawings.

3.3 CLEANING AND PROTECTION

A. Clean bollards as recommended by manufacturer.

B. Touch-up, repair, or replace damaged bollards before Substantial Completion.

END OF SECTION 323913