

PROJECT MANUAL

BBS

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FOR:

**Capital Improvements
(Bond Phase II)**

at

**Golden Hill E.S., S.S. Seward Institute
and S.S. Seward Memorial**

FLORIDA UNION FREE SCHOOL DISTRICT
TOWN OF FLORIDA, ORANGE COUNTY NY

**NEW YORK STATE EDUCATION
DEPARTMENT NUMBER:**

S.E.D. No. 44-21-15-02-0-004-013

S.E.D. No. 44-21-15-02-0-001-015

S.E.D. No. 44-21-15-02-0-003-010

B.B.S. PROJECT NUMBER:

20-176 a-c

DATE:

Bid Pick-Up: March 15, 2021

ARCHITECTS CERTIFICATION

THE UNDERSIGNED CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE, INFORMATION, AND BELIEF, THE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE, THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE, THE CONSTRUCTION STANDARDS OF THE EDUCATION DEPARTMENT, NEW YORK STATE DEPARTMENT OF LABOR RULE 56, EPA AND AHERA REQUIREMENTS.

Lawrence Salvesen, A.I.A. Lic. No. 020623

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PROJECT DIRECTORY

Architects/Engineers:	BBS Architects, Landscape Architects and Engineers, P.C. 244 East Main Street Patchogue, NY 11772 (631) 475-0349 (631) 475-0361 FAX
Superintendent of Schools:	Ms. Jan Jehring (845) 651-3095
Director of School Facilities and Operations:	Tom Andryshak (845) 651-3095
District Counsel:	Shaw, Perelson, May & Lambert, LLP 21 Van Wagner Road Poughkeepsie, NY 12603
Construction Manager:	Triton Construction 30 East 33rd Street, 11th Floor New York, NY 10016 (212) 388-5700

CONDITIONS OF THIS CONTRACT

- A. Before attempting to deliver materials to the site, the Contractor shall inform the Owner's Representative so that arrangements can be made for places of entrance and inspection of materials being delivered.
- B. The Contractor shall provide written guarantee of the complete installation to be free from defects in materials and workmanship in accordance with Section 01700. Any portion of the work judged inferior shall be replaced by the Contractor at no additional cost to the Owner.
- C. The Contractor shall maintain operational exits, exit lights, danger signs, open trench markings, fire emergency equipment, night lights, and proper storage facilities for equipment and materials as directed through the length of the Contract.
- D. The Contractor shall be totally responsible for general site clean up and removal of all materials and equipment related to this Contract at the end of the Contract.
- E. The Contractor shall take over and maintain the site immediately after receiving the order to start work. Provide protection of property and utilities until work of the Contract is complete and accepted. The Contractor shall be responsible for the safety of any adjoining property, including paving, utility mains, pipes conduit, etc., and shall, at his own expense, protect and maintain same in at least as good a condition as that in which they were found.
- F. All seeded areas, pavements, walks, curbs, and approaches shall be kept clear at all times and, if disturbed by this construction work, shall be repaired and restored with materials to match existing.
- G. Before commencing any work, the Contractor shall verify all coverage, and conditions prevalent at the job sites. If no discrepancies are found, the contractor shall report all corrections in writing. If no corrections are brought to the attention of the School District and the Architect/Engineer before starting installation, the Contractor will be totally responsible for this installation providing complete coverage of the area designated.
- H. Upon completion of the work, the Contractor shall furnish as-built drawings showing the exact locations of every new item.
- I. It is assumed that Contractor's prices are based on scope of work complete and as confirmed by site(s) inspections prior to bidding.
- J. Contractor shall be responsible for all incidental electric and plumbing work required to complete work under this Contract.
- K. All repair and patching work shall be done in a professional manner. The Contractor shall take care to match new and existing surfaces and materials as closely as possible for a continuous finish where duplication is impossible.
- L. Equivalents: Where, in these specifications, kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal, and the Contractor may select one of those items.

If the Contractor desires to use any kind, type, brand, or manufacturer of material other than those named in the specifications as the basis of the bid, the Contractor shall indicate in writing with the bid, within 72 hours after the bid, or prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified items, and submit information describing in specific detail wherein it differs from the quality and performance required by the base specifications and such other information as may be required by the Owner. The Contractor may, at any time, propose to use in the work an equivalent item in lieu of that specified with no change in the bid amount.

- M. All prospective bidders shall be required to provide proof of demonstrated competence and experience in this type of work as outlined in these specifications, and each bidder must submit names and addresses of previous jobs completed by his firm, which involved the type of work outlined in the specifications. Bidders are required to complete the "Statement of Bidders Qualifications" form contained herein and submit it with their bids.
- N. At least three letters of reference for this type of work completed in the last five years shall be provided upon request, with pertinent company names and addresses of the firms for which the work was done indicating type of work, scope of work, and complete work. The district has the right to verify these letters as well as examine other aspects of the bidder's work record.
- O. As is usual with capital project payments, the district will retain five percent of each payment issued on verified requisitions for payment submitted by the Contractor. This retainage total will be paid upon satisfactory completion of all the work.
- P. The maximum gross weight of vehicles used shall not exceed 2,500 lbs. per wheel in the area of playgrounds and athletic fields. The equipment shall be equipped with flotation type tires. On the front lawns, the pounds per square inch exerted on the turf-grass shall not exceed 15 lbs. per square inch and on the back athletic area shall not exceed 32 lbs. per square inch.
- Q. The Contractor shall be required to conform to all OSHA requirements regarding Lock-out/Tag-out procedures. This shall include, but not be limited to, disconnecting the power to any equipment to be serviced via a disconnect switch or breaker, locking out this power source, and tagging this lockout with appropriate wording as per OSHA requirements. This shall apply to any power source associated with this project.
- R. Certificate of Occupancy: During construction, school district personnel shall monitor the occupied portion of any school building to assure that it complies with the minimum requirements necessary to maintain a Certificate of Occupancy.
- S. Complaints: Boards of Education and BOCES shall follow procedures established under Section 155.4 (d) (7) for the investigation and disposition of complaints relating to health and safety received as a result of construction and maintenance activities.
- T. Health and Safety Committee: Boards of Education and BOCES shall establish procedures for involvement of the health and safety committee to monitor safety during school construction projects.

- U. Emergency Plan: The district emergency plan shall be updated to reflect any changes necessary to accommodate the construction process.
- V. Fire Drills: Fire drills shall be held to familiarize students and staff with temporary exits and revised emergency procedures.
- W. Notification: Boards of Education and BOCES shall establish procedures for notification of parents, staff, and the community in advance of a construction project of \$10,000 or more.
- X. Fire and Hazard Prevention: The following shall be strictly enforced:
 - 1. During construction, daily inspection of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment, and debris do not block fire exist or emergency rescue windows.
 - 2. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.
- Y. Radon: Districts shall take responsibility to be aware of the geological potential for high levels of radon and test and mitigate as appropriate.
- Z. Post Construction Inspection: The school district or BOCES shall provide the opportunity for a walk-through inspection by the Health and Safety committee members to confirm that the area is ready for occupancy.
- AA. Some of the proposed work may require various contractors to enter crawlspace or pipe tunnel areas, and/or access plenum spaces associated with the existing ceiling and wall systems (typical throughout). Please be advised that these spaces contain asbestos containing and/or asbestos contaminated materials. Any disturbance of said materials may result in the release of airborne asbestos fibers, therefore potentially creating a hazardous condition to the workers.

In accordance with 40 CFR Part 763, all contractors associated with this project are warned of the presence of the asbestos containing, and potentially asbestos contaminated materials within these spaces, and the potential hazard associated with the disturbance of these materials. Each contractor is required to have workers "certified and licensed to work in an asbestos hazard environment" to fulfill their contract requirements in these areas as part of their base bid. Per NYCRR 56, any person who may potentially disturb friable or non-friable asbestos during the course of any employment shall possess a valid restricted handler - allied trades certificate and shall have such certificate, or a copy thereof, in his or her possession at all times while working on the project. This person shall be aware of the health hazards of asbestos and take appropriate precautions to avoid any ACM, PACM or asbestos material disturbance throughout the course of their work. Abatement of any quantity of ACM, PACM or asbestos material is not allowed by this person under any circumstance.

The contractor shall notify the owners representative when work will be undertaken in these areas so that an independent monitoring firm can be available to monitor the activities within these spaces.

END OF SECTION

**Invitation to Bidders
BOARD OF EDUCATION
Florida Union Free School District
51 N. Main Street, P.O. Drawer 757
Florida, NY 10921-0757**

PUBLIC NOTICE: is hereby given for separate sealed bids for: **Bond Phase II Projects at Golden Hill E.S., S.S. Seward Institute and S.S. Seward Memorial.** Bids will be received by the School District, on April 9, 2021 at 1:00p.m. in the **Board Room, S.S. Seward Memorial 51 North Main Street Florida, New York, 10921.**

The bid opening will be held by way of video conference via Google Hangouts/Meeting, meet.google.com/mfu-tadm-gfj, at which time sealed bids will be publicly opened and read aloud.

The Contract Documents may be examined at the Office of the Architect, **BBS Architects, Landscape Architects and Engineers, P.C., 244 East Main Street, Patchogue New York, (631-475-0349)**; however the Contract Documents may only be obtained thru the Office of **REV, 330 Route 17A Suite #2, Goshen New York 10924 (877-272-0216)** beginning on March 15, 2021. Complete digital sets of Contract Documents shall be obtained online (with a free user account) as a download for a **non-refundable fee of Forty-Nine (\$49.00) Dollars** at the following websites: www.bbsprojects.com or www.usinglesspaper.com under 'public projects'. Optionally, in lieu of digital copies, hard copies may be obtained directly from REV upon a **deposit of One Hundred (\$100.00) Dollars** for each complete set. **Checks for deposits shall be made payable to the DISTRICT, FLORIDA UNION FREE SCHOOL DISTRICT** and may be uncertified. All bid addenda will be transmitted to registered plan holders via email and will be available at the above referenced websites. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs. Plan holders who have obtained hard copies of the bid documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with the printer for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda. The bid deposit for hard copies will be returned upon receipt of plans and specifications, in good condition, within thirty days after bid date, except for the lowest responsible bidder, whose check will be forfeited upon the award of the contract.

A non-mandatory pre-bid site walk through for all trades is scheduled for March 25, 2021 at 3:30pm. All parties shall meet at SS Seward Institute Main Entrance.

The Contract will be awarded to the lowest responsible bidder or the proposals will be rejected within 45 days of the date of opening proposals. Bids shall be subject, however, to the discretionary right reserved by the School District to waive any informalities, accept or reject any alternatives, reject any proposals and to advertise for new proposals, if in its opinion the best interest of the School District will thereby be promoted.

Each bidder may not withdraw his bid within 45 days after the formal opening thereof. A bidder may withdraw his bid only in writing and prior to the bid opening date.

BY ORDER OF THE
BOARD OF EDUCATION
Florida Union Free School District
Dated: March 9, 2021

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1. DOCUMENTS (ISSUANCE AND RESTRICTIONS)

- A. Bid documents may be examined at the applicable office of the Architect, BBS Architects, Landscape Architects & Engineers, P.C., 244 East Main Street, Patchogue New York or 187 Wolf Road, Albany New York between the hours of 9 a.m. and 4 p.m. daily except Saturdays, Sundays, and holidays.
- B. A deposit, refundable in accordance with the Invitation to Bidders, is required for each set of Bid Documents.
- C. Bid documents are comprised of all bid-related documents including, but not limited to, the Invitation to Bidders, Instructions to Bidders, Supplementary Information to Bidders, if any, Bid Proposal Forms, Addenda issued prior to the bid date, and the Contract Documents. Contract Documents consist of the form of Agreement between the Owner and the Contractor, other documents enumerated in the Agreement between the Owner and the Contractor ("the Agreement"), Conditions of the Contract (General, Supplementary and other conditions or provisions), Drawings, Specifications and all addenda issued prior to execution of the Contract and modifications issued after execution of the Contract.

2. QUALIFICATIONS OF BIDDERS

A Bidder must present information and/or documentation proving that:

- A. It has the financial capability to produce and execute the project within the time periods specified;

- B. It possesses a minimum of five years continuous experience as a firm doing business under the same name, engaged principally as a contractor for the Work proposed.
- C. It has completed at least five similar projects, listing type and scope of work, names and addresses of owners and dates of Contract completion (the Owner has the right to verify the documentation as well as examine other aspects of the Bidder's work record);
- D. It can provide tabulation of equipment and facilities at its disposal to do the proposed Work;
- E. It has a current bonding capacity to accommodate proposed Work
- F. It has the experienced staff and technical organization necessary for the Project;
- G. It maintains an office with full-time employees in a commercial space;
- H. It intends to complete at least 25 percent of the Work with its own forces (General Conditions, Mobilization, etc. will not count toward the 25 percent;
- I. It is not currently involved in bankruptcy proceedings;
- J. It is licensed to perform the Work it is bidding on in the jurisdiction the Work will take place; and
- K. It has the insurance required by the Contract Documents to protect the Owner or is able to obtain the required insurance.
- L. The Bidder must provide a complete Schedule of Values on an AIA form G703. This Schedule must be revised and resubmitted until satisfactory to the Architect. All project phases, activities and work items must be broken out individually with lines for both labor and materials. In addition to this and to the required retainage, the Schedule of Values must be structured with the following values:

General Conditions:	5% of overall contract value
Bonds and Insurance:	4% of overall contract value
Submittals:	1% of overall contract value
Punch List:	3% of overall contract value
Commissioning (if applicable):	TBD based on specific project
Closeout and O&M Manual:	2% of overall contract value
- M. The Bidder is required to complete and submit the "Statement/Proof of Bidder's Qualifications" form contained herein.
- N. It is assumed that in preparing this bid, the Bidder has already compiled this information, and that it is being made available for reference with completing this package. All information contained above must be submitted to the Architect prior to award of the Contract. Failure to provide this information may result in disqualification of the Bidder.

3. COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

- A. Bidder must comply with applicable federal, state, and local laws as well as all ordinances, rules, and regulations affecting the Work.
- B. The provisions of General Municipal Law, Section 103A, as it relates to refusal to testify or sign a waiver of immunity against prosecution and the submittal of bids and transactions with the State of New York, or a political subdivision thereof, governs work under this contract.
- C. Wage rates as determined by the New York State Department of Labor pursuant to the labor laws of the State of New York apply to all Work under this Contract.
- D. 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 (2) the form entitled "Declaration of Bidder's Inability to Provide Certification of Compliance with the Iran Divestment Act."

4. SINGLE PRIME CONTRACTS

- A. Where the project cost does not exceed \$1,500,000 and the Owner has decided to solicit bids from one general contractor, the Bidder must submit with its bid a separate sealed list that names each subcontractor that the Bidder will use to perform Work on the Contract, and the agreed-upon amount to be paid to each, for: (A) plumbing and gas fitting; (B) steam heating, hot water heating, ventilating and air condition apparatus and (C) electric wiring and standard illuminating fixtures.

After the low bid is announced, the sealed list of subcontractors submitted with the low bid will be opened and the names of the subcontractors will be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each will require the approval of the Owner, upon a showing presented to the Owner of legitimate construction need for the change, which will be open to public inspection. Legitimate construction need includes, but is not limited to, a change in project specifications, a change in material costs, a change to subcontractor status as determined pursuant to New York Labor Law § 222(2)(e), or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. The sealed list of subcontractors submitted by all other bidders will be returned to them unopened after the Contract award.

5. EXAMINATION OF DOCUMENTS AND SITE

- A. Bidder must visit sites of proposed Work and be fully familiarized with conditions as they exist, as well as the character of the operations to be carried on under the proposed Contract.

- B. Bidder must make all necessary on-site investigations so as to understand facilities, difficulties, and restrictions attending the execution of the Work including access to and conditions of the Work sites and properties.
- C. A Bidder will be presumed to have visited the site prior to submission of a proposal and to have familiarized itself with surface and subsurface conditions, existing structures and any and all conditions that may in any way affect the Work. Failure to have so acted will in no way relieve a Bidder from its obligation to perform the proposed Work for the consideration set forth in its bid.
- D. At the time of the opening of bids, each Bidder will be presumed to have read and to be thoroughly familiar with the Drawings and Contract Documents, including all addenda. The failure or omission of any Bidder to receive or examine any form, instrument or document will in no way waive relieve any Bidder from its obligation to perform the proposed Work for the consideration set forth in its bid.
- E. If, prior to the submission of its bid, a Bidder fails to notify the Architect in writing of the existence of any condition, ambiguity, inconsistency or error in any of the Contract Documents, or to a conflict between provisions in any Contract Document and provisions of applicable laws, regulations, ordinances, or codes, its bid will be conclusively presumed to have been based upon the interpretation of the ambiguity or inconsistency, or the directions correcting the error or conflict which may subsequently be given by the Architect.

6. AMBIGUITIES, INTERPRETATIONS, AND ADDENDA

- A. No oral interpretations, instructions, or explanations of the Bid Documents will be given prior to the opening of the bids. Discrepancies, ambiguities, or doubts as to the intent of a Bid Document should be communicated to the Architect in writing for interpretation.
- B. Interpretations of, clarifications of, amendments to or corrections to the Bid Documents will be made in writing in the form of addenda forwarded to each person to whom or each entity to which Bid Documents have been issued and will become part of the Bid Documents. Each Bidder must acknowledge receipt on the Bid Proposal Forms. Replies issued in any other manner will not be binding. The Architect will not be responsible for oral clarifications.

7. PRE-BID CONFERENCE

- A. When indicated in the Invitation to Bidders, a pre-bid conference will be held, at which time the Architect will have a representative available to respond to questions regarding the Bid Documents.
- B. Addenda clarifying pertinent questions or concerns raised at the pre-bid conference, requiring modification of the Bid Documents, will be issued for the record and become part of the Bid Documents.

- C. Notice as to the time and place of the pre-bid conference is stated in the Invitation to Bidders.

8. BASIS OF BID - PERFORMANCE AND QUALITY STANDARDS

- A. GENERAL: To establish performance and quality standards for the products, materials, and equipment required in the Work, the Contract Documents detail performance criteria, or specify two or more items or materials which are presumed to be equal. This method of establishing a level of quality is not intended to exclude products that are equivalent in quality, performance, appearance, and function to those specified.

- B. EQUIVALENTS: The Bidder may propose to use in the Work an equivalent item in lieu of that specified with NO CHANGE to the Bid Amount. The Bidder, proposing to utilize this equivalent procedure, must provide a detailed descriptive submission of the proposed material, equipment, or method being offered as equal to those specified, including an explanation of all deviations from the product specified in the Contract Documents. The Bidder is responsible to prove equality and, in that regard, must supply all additional information requested by the Architect, as well as pay for any required testing to support these claims. Further, the Architect is to be the sole judge of product equivalency for the purpose intended, considering equality, workmanship, aesthetics, services, maintenance, economy, and reliability of operation.

If the Bidder has used equivalents as the basis of the bid, the "Proposed Equivalent Form", which is included in the Project Manual following the Bid Proposal Form, must be submitted as an attachment to the Bid Form or within 72 hours after the bid or prior to the award of the Contract. This form may be reproduced, if necessary, for a full listing of equivalents to be considered. This does not exclude the Bidder from submitting equivalents after the award of Contract. The intent of this process is that, if the Bidder is already aware of an equivalency submission, the risk of acceptance can be reduced by verifying equivalency and, therefore, the bid price prior to award. The risk of whether proposed equivalents are accepted is borne by the Bidder.

- C. SUBSTITUTIONS: For consideration by the Owner, the Bidder may propose to use in the Work substitute items in lieu of those specified, which do not meet the project performance and quality criteria, and can be furnished and installed at a reduced cost (credit) to the Owner with no impact on the Work being done by others.

1. Proposed substitutions must be submitted with the bid or within 72 hours after the bid or prior to the award of the Contract, on the Proposed Substitution Form, which is in the Project Manual following the Proposed Equivalent Form. The Bidder must list any and all deviations from the Contract Documents as well as the corresponding credit amount to be deducted from the Base Bid Proposal if the substitution is accepted by the Owner. This does not exclude the Bidder from submitting a substitution for consideration after the award of the Contract.

2. Substitutions cannot be used as the basis of the bid, they must be listed separately and will be evaluated on a case by case basis. All base bid amounts must be based on the specified materials or acceptable equivalents.
3. In no way will the proposed substitutions influence the successful bidder selection process. Substitutions may not be used to arrive at the lowest qualified bid amount.
4. If a substitution is accepted, the Bidder must coordinate the installation of the substitute and make all associated changes required. The Bidder also waives any claim for additional cost associated with the substitute which becomes apparent before, during, or after installation. The Bidder agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution.

9. PREPARATION, IDENTIFICATION, AND SUBMISSION OF PROPOSAL

- A. Bidders must submit triplicate copies of the Bid Proposal Forms (one marked 'Official Tender' and others marked 'Copy'), properly signed and completed in every respect pursuant to these Instructions to Bidders, in an opaque, sealed envelope plainly and prominently marked:

"Sealed Bid for (Project Name) _____

Bid Date _____, 20____, by (Name/Address of Bidder)."

- B. Attached to the Bid Proposal Forms envelope, Bidders must submit Bid Security pursuant to Paragraph 10 of these Instructions to Bidders.
- C. All bids will be held for a period of 45 calendar days after their receipt and opening, during which time the Owner has the right to enter into a contract, and the bid securities of the three lowest bidders will be held until the execution of the Contract.
- D. The Owner reserves the right to reject any or all bids proposals and to waive any or all informalities, defects or irregularities in the bid proposals. The Owner reserves the right to make partial awards based on low bids for each item or may select to award on total low bid.
- E. Once the Bid Proposal Forms have been submitted in the sealed envelope, there can be no alterations or amendments; external markings or separate supplementary information will, in no way, affect the sealed bid information. Any necessary adjustment to the proposal must be made prior to its submission and be part of the enclosed sealed bid.
- F. All costs in connection with preparation and submission of bid proposals shall be borne by the Bidders.

- G. A Bidder must submit promptly, upon request of the Owner or Architect, documentary evidence as to its financial, technical, and practical ability to carry out the Work.
- H. A Bidder may withdraw its bid, either in person or by telegraphic or written request, at any time prior to the scheduled closing time for the receipt of bids. Negligence on the part of the Bidder in preparing its bid confers no right for the withdrawal of the bid after it has been opened.

10. BID SECURITY

- A. Each bid must be accompanied by bid security of not less than five percent (5%) of the amount of the bid (including base bids and alternates), which may be a certified check, cashier's check, bank draft, or bid bond executed by a Surety Company authorized to do business in the State of New York and made payable to the Owner.
 - 1. Bid Security must 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 must 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 must 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. The Surety must be rated as equal to "A-" or better as to "Policy Holder Ratings" by "Best's Key Rating Guide."
 - d. The bonding limit for each Bidder cannot 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. In the event any of the requirements outlined herein are not complied with, the Owner will have the right to reject the bid.
- B. Bid security will be returned to all except the three lowest bidders, after formal analysis and evaluation of bids. No bid will be held beyond the 45-day period stipulated above.

- C. Remaining bid security will be returned to bidders after Owner and the successful bidder have executed the Agreement and the Owner has received and approved performance and payment bonds.
- D. If the Agreement has not been executed within the specified period of time after the bid opening, the bid security of any Bidder will be returned upon its request, provided it has not been notified of acceptance of its bid prior to the date of its request.

11. RECEIPT AND OPENING OF BIDS

- A. Bids will be received up to the time and at the location indicated for the opening in the Invitation to Bidders, after which they will be visibly opened and read aloud, and the contents made known to all interested parties present. Each Bidder assumes the risk of any delay in the mail or in handling of mail by employees of the Owner or others.

12. MODIFICATION OR WITHDRAWAL OF PROPOSAL

- A. Bid may not be modified after it has been deposited with Owner.
- B. Bid may not be withdrawn after time set for receipt of bids.
- C. Withdrawn bid may not be resubmitted.
- D. Bid withdrawn after opening of bids will result in forfeiture of bid security.

13. DISQUALIFICATION OF PROPOSAL

- A. The Bidder acknowledges the right of the Owner to reject any or all bids. The Owner reserves the right to reject any or all bids proposals and to waive any or all informalities, defects or irregularities in the bid proposals.
- B. Bid may be disqualified and rejected under any or all of the following conditions:
 - 1. If the Bidder fails to furnish the required bid security, or to submit data required by the Contract Documents, or if the Bid is in any way incomplete or irregular.
 - 2. If the Bid has not been deposited at the designated location prior to the date and time for receipt as indicated in the Invitation to Bidders and these Instructions to Bidders.
 - 3. If there is reason to believe that a Bidder has submitted more than one bid for the same project.
 - 4. If there is reason to believe that collusion exists among Bidders.
 - 5. A Bidder's failure to establish to Owner's satisfaction:
 - a. Proof of ownership, control, or ability to procure necessary plant and equipment to commence the Work at the time prescribed and thereafter prosecute and complete at the rate, or within the time specified.

- b. That Bidder is not already obligated by prior commitment to other work as to likely delay start, prosecution, or completion of the Work required by the Contract Documents.
- c. That Bidder proposes to use reliable and responsible subcontractors or suppliers.

14. AWARD OF CONTRACT

- A. The Contract will be awarded to the lowest qualified responsible Bidder, provided its bid is reasonable and it is in the best interest of the Owner to accept.
- B. Owner may determine the lowest bid by adding one base bid to other base bid(s) and/or by adding to or deducting from those base bid(s), additive or deduct alternates, or substitutions, if any, which the Owner elects to accept after the opening of bids.
- C. The Owner reserves the right to make partial awards based on low bids for each item or may select to award on total low bid.

15. EXECUTION OF AGREEMENT

- A. The Agreement will be prepared by Owner.
- B. The Agreement must be executed in triplicate within ten calendar days after notification of award at which time the successful contractor must deliver to the Owner all the necessary counterparts of the Agreement in the form set forth in the Bid and Contract Documents.
- C. Performance and payment bonds must be submitted in the form of A.I.A. Document A312, covering performance as well as labor and material payment and extended for the period of time stipulated in Article 11 of the General and/or Supplementary General Conditions, "Bonds and Insurance". An executed bond must be issued by a surety company licensed in New York State.
- D. At the time of execution of the Agreement and prior to the start of construction operations, the successful bidder must furnish documentation in the form and amounts required by the provisions of the Contract Documents that set forth the insurance requirements.
- E. The successful bidder must submit Schedule of Values, as per A.I.A. Form G702A and provide breakdown of costs.
- F. The successful Bidder, upon its failure or refusal to execute and deliver the required documentation, including but not limited to the Agreement and required bonds and proof of insurance within ten calendar days after the Bidder received notice of the acceptance of its bid, will forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with its bid.

16. TAXES AND PERMITS

- A. Material purchased for use in the construction of buildings owned by the Owner are exempt from Federal excise and State sales taxes when the materials are incorporated into and become part of the completed improvement.
- B. Materials, appliances, tools, equipment, or fuel costs which do not become part of the completed improvement will be subject to all applicable taxes.
- C. The Owner is not subject to Federal Tax on transportation of property.
- D. Local Building Permit will not be required.
- E. Exemption certificates will be furnished by Owner for purchases of materials where material is to be incorporated into Work, upon receipt of a copy of the supplier's invoice showing items, net prices, and federal excise tax separately.

17. SUBCONTRACTOR'S LISTING

For multiple prime contracts, a listing of all subcontractors and major material suppliers (including address, telephone number, and name of individual to contact) whose services are proposed to be employed on the project must be submitted within 15 calendar days after signing of the Agreement.

18. TIME OF COMPLETION

- A. **Bidder shall agree to start work immediately upon award of contract and shall be substantially complete no later than the dates in accordance with the enclosed Construction Manager's project schedule. Refer to Information Available to Bidders - Construction Manager Special Provision.**

19. CONDITIONS OF WORK OPERATIONS

- A. Work under the Contract must be executed and pursued without interruption of or interference with the Owner's operations.
- B. Work operations, access to buildings, and extent of movement of personnel within buildings must be coordinated with and limited by Owner.
- C. Contractor must notify Owner in writing at least 24 hours in advance to advise of intended Work operations to be scheduled and receive approval prior to starting Work.

20. REQUIRED BID INFORMATION:

A. In addition to any other information/documentation required by these Instructions to Bidders or other Bid Documents, the following information/documentation must be submitted with each bid to be considered a complete and responsive bid. Failure to include any required document in the bid submission may lead to disqualification or rejection of a bid, at the sole discretion of the Owner.

- 1) Bid Proposal Form
- 2) Proposed Equivalent Form
- 3) Proposed Substitution Form
- 4) List of Subcontractors - Provide in a sealed envelope along with bid. (If a Single Prime Contract - See Paragraph 4(A) of these Instructions to Bidders).
- 5) Iran Divestment Act Forms (Certification of Compliance or Declaration of Inability), signed and notarized
- 6) Bid Bond/Security
- 7) Information/documentation required by Paragraph 2 of these Instructions for Bidders and the Statement/Proof of Bidder's Qualifications Form.

END OF SECTION

INFORMATION AVAILABLE TO BIDDERS

BBS Architects, Landscape Architects & Engineers, P.C. (BBS), accepts no responsibility for information contained within the items listed below that have been provided by others.

Any questions concerning information contained within these items shall be forwarded via the standard Request for Information process. BBS will forward these Requests for response by the appropriate party.

- A. Construction Manager Special Provision - Prepared by Triton Construction. 30 East 33rd Street, 11th Floor New York, NY 10016. 212-388-5700. Document follows this section.
- B. Pre-Construction Survey, Bulk Sampling and Analysis of Suspect Asbestos Containing Materials - Prepared by JC Broderick & Associates, Inc. 1775 Expressway Drive North - Suite 1, Hauppauge NY 11788 631-584-5492. Document follows this section.
- C. Pre-Construction Lead Materials Inspection and Sampling - Prepared by JC Broderick & Associates, Inc. 1775 Expressway Drive North - Suite 1, Hauppauge NY 11788 631-584-5492. Document follows this section.
- D. Pre-Construction PCB Inspection and Sampling - Prepared by JC Broderick & Associates, Inc. 1775 Expressway Drive North - Suite 1, Hauppauge NY 11788 631-584-5492. Document follows this section.
- E. Site Survey - Prepared by Tectonic, 1279 Route 300, Newburgh, NY 12550, 845-567-6656. Document follows this section. Survey of existing conditions (and underground structures and utilities determined from ground penetrating radar) prior to any site construction.
- F. Soil Boring & Geotechnical Engineering Report - Prepared by Tectonic, 1279 Route 300, Newburgh, NY 12550, 845-567-6656. Document follows this section.
- G. The surveys and subsurface investigations were prepared for the Owner of the use in design. These documents are not part of the Construction Contract Documents and are provided by the Owner for informational use only.
 - 1. The enclosed report and log of borings and any interpolations of conditions between test borings is not a warrant or guarantee by the Owner or Architect/Engineer of subsurface conditions.
 - 2. The Contractor should visit the site and become acquainted with the existing conditions. Bidders are encouraged to make their own investigations to satisfy themselves as to the site conditions. Any additional information, needed by the Contractor, shall be obtained by the Contractor at no cost to the Owner.

END OF SECTION

SPECIAL PROVISIONS

These Special Provisions are in addition to the Plans, Specifications and the other Contract Documents and shall be part of this Agreement between the Owner and the Contractor. All references to "This Prime Contractor", "This Contractor" or "Contractor" refer to the **General Contractor, Plumbing Contractor, Mechanical Contractor, Electrical Contractor and Site Work Contractor**. In cases of contradictions, the most stringent Provision shall govern.

General Requirements for Each Prime Contractor

I. General

1. All dates, durations, etc. defined herein shall be in business days.
2. Except for the basic building permit, each Prime Contractor's price shall include all fees and other costs for securing and maintaining (by the Prime Contractors or their subcontractors) for the life of the job; all permits, PE licenses, connection fees, inspections, etc., applicable to, or customarily secured for the Work. This provision includes any applications and/or permits to be issued by utility companies in the name of the Prime Contractor, or the Owner, as required for the Work. Originals of all permits are to be issued in the name of the Prime Contractor as required for the Work. The Prime Contractor shall furnish the Construction Manager with original copies of all permits prior to the commencement of the Work, and, shall prominently display a copy of all permits at a location agreed to with the Construction Manager.
3. One week after Notice to Proceed (NTP), each Prime Contractor shall provide two copies of a video taped recording of all existing conditions to the Construction Manager. This taping shall provide a record of all-existing buildings, grounds, exterior conditions and interior conditions. The Contractor shall schedule a representative of both the Owner and the Construction Manager to be present at this taping. In the absence of this record, the Prime Contractor shall be responsible for paying the costs associated with any and all repairs or replacements of existing materials and/ or conditions that were damaged in an area where the Prime Contractor is working or has worked, as may be deemed necessary by the Owner or the Construction Manager.
4. Each Prime Contractor is responsible for providing the required mock-ups defined by the Contract Documents out of sequence as needed by the Architect.
5. Each Prime Contractor is responsible for providing all required Engineered material calculations as defined by the contract documents.
6. Each Prime Contractor shall provide drinking water for his own employees.
7. On Site Communications. Each Prime Contractor shall provide, or otherwise see that, the project manager, or site managers, and/or responsible workers of each Prime Contractor and major subcontractor are equipped with cellular phones for the purpose of staying in contact with for the Construction Manager.

8. Each Prime Contractor shall include in his base price the cost of all rigging and equipment required for the performance and installation of the Work.

II. Schedule

1. All Contractors are to recognize that the Project Schedule is of critical importance to the Owner. All aspects of construction must reflect a 'time is of the essence' construction strategy. The attached 'Bid Schedules' serves as a guide of critical milestone dates to the Project. Failure to meet intermediate milestone dates will jeopardize the overall Project Schedule. This failure will mandate Contractor(s) to, increase staff, work overtime, or use other means to recover time, at the costs of those Contractor(s) responsible for such delays. In addition, all costs due to delays in completion of the Work, which require additional Custodial Overtime, Construction Management services, Architectural services, and Engineering services beyond the Work duration in the Bid Schedule, shall be borne by Contractor(s) responsible for delays.
2. Each contractor, prior to being awarded the contract shall prepare and submit a Preliminary Master Project Schedule for their Work. **Within (3) weeks of NTP all Prime Contractors will provide a coordinated Draft master schedule.** Each Prime's Project Schedule are to reflect all requirements for submittals, material and equipment procurement, material stockpiling, setting up Contractor's staging area and surveying of existing conditions. These Schedules, reflecting the critical milestone dates established by the attached 'Bid Schedule', are to be coordinated and shall be inclusive of other Prime Contractor's activity. The "Final" agreed upon overall schedule of work shall be developed and maintained by the Prime Contractor for General Construction in conjunction with the Construction Manager utilizing each Prime Contractor's Preliminary and updated Schedule(s). Specific relationships between Contractors, sequencing of activities, phasing, and critical "ties" of coordinated Work must be detailed on the Project Schedule. All Contractors shall utilize "Sure Track Project Manager 3.0-" as produced by Primavera Systems, Inc., -or- equal platform producing Gant Style Scheduling.
3. All Prime Contractors shall review the completed "Final" detailed construction schedule and acknowledge their acceptance of this schedule by signing a copy to be kept on record by the Construction Manager. This agreed upon schedule must incorporate all milestone dates and shall be established within five (5) weeks of Notice to Proceed.
4. The Prime Contractor for General Construction shall update the detailed construction schedule with the Construction Manager and issue copies to the other Prime Contractors, the Owner, Construction Manager, and the Architect monthly. Each Prime Contractor shall provide the Prime Contractor for General Construction with all information necessary to provide these updates.
5. Each Prime Contractor is to submit a schedule of projected fabrication on long lead items (items requiring four weeks and over to fabricate) three weeks after Notice to Proceed. Progress/Status reports on fabrication to be submitted to the Construction Manager every two weeks. 'Rate of Change' chart and marked up shop drawings to be included in these reports.

6. The Prime Contractors shall be responsible for coordinating and expediting their fabrication and delivery schedules and keeping the Construction Manager informed as to their progress and their anticipated ability to stay on schedule. Should it become necessary (in the opinion of the Construction Manager) to supplement the Prime Contractor's expediting efforts in order to maintain job progress, the Construction Manager may elect to charge all costs incurred to said Prime Contractor.
7. In the event that Owner makes special arrangements to open a building at the request of a Contractor and the Contractor does not show, the Prime Contractor shall pay the Owner all costs incurred. All parties agree that any action taken to enforce this requirement shall not be construed by any Prime Contractor or its subcontractors/suppliers, as a reason for a claim (for either time or money) for delay to the Work or to the Prime Contractor, its subcontractors, or suppliers.
8. The Owner shall take partial occupancy of the building additions and renovated spaces in accordance with the dates established by the Bid Schedule and the Special Provisions. The Contractors shall perform all Work necessary to maintain the Owner's move-in and occupancy schedule.
9. The Contractors shall include in their base price, all out of sequence Work and any Work required to be performed during overtime hours or non-working hours necessary to maintain the Master Schedule, the Prime Contractors' project schedule, or, the Owner's move-in schedule.

Milestone Requirements

Submittal Priorities

The following submittal dates (in calendar days) are critical to allow for proper fabrication time frames to ensure timely completion of the project to meet the attached bid schedule. A complete listing of all submittal requirements is located in "Section 01300 Submissions", which shall be accompanied by each division's specific submittal requirements.

Major General Construction Submittals

Scaffolding and/or Stair tower-(may require PE Stamp)	15 days from Notice to Proceed
Bracing/Shoring-(may require PE Stamp)	15 days from Notice to Proceed
Foundation Shop Drawings	15 days from Notice to Proceed
Rebar/Reinforcing Shop Drawings	15 days from Notice to Proceed
Structural Steel/Decking	15 days from Notice to Proceed
Masonry Submittals/Shop Drawings	15 days from Notice to Proceed
Stormwater/Sanitary	15 days from Notice to Proceed
Doors/Hardware	15 days from Notice to Proceed
Windows/Openings	15 days from Notice to Proceed
Storefront	15 days from Notice to Proceed
Waterproofing	15 days from Notice to Proceed
Louvers	15 days from Notice to Proceed
Interior Finishes	20 days from Notice to Proceed
Display Cases/Cabinets/ Equipment	20 days from Notice to Proceed
Casework	20 days from Notice to Proceed
All remaining Submittals with-in	20 days from Notice to Proceed

Major Roofing Construction Submittals

Roofing/Tapered Shop Drawings	10 days from Notice to Proceed
Roofing	10 days from Notice to Proceed
Mechanical Curbs	10 days from Notice to Proceed
Misc. Structural Steel	15 days from Notice to Proceed
All remaining Submittal with-in	20 days from Notice to Proceed

Major Plumbing Equipment

Plumbing Equipment	15 days from Notice to Proceed
Plumbing Fixtures	15 days from Notice to Proceed
Sprinkler Piping, Accessories, and Equipment	15 days from Notice to Proceed
All remaining Submittals with-in	20 days from Notice to Proceed

Major HVAC Equipment

Duct Work	15 days from Notice to Proceed
Equipment/RTU's	20 days from Notice to Proceed
Controls	20 days from Notice to Proceed
Hot/Chilled Piping and Enclosures	20 days from Notice to Proceed
All remaining Submittals with-in	20 days from Notice to Proceed

Major Electrical Equipment

Service Equipment	15 days from Notice to Proceed
Security	15 days from Notice to Proceed
Technology	15 days from Notice to Proceed
Light Fixtures	15 days from Notice to Proceed
All remaining Submittal with-in	20 days from Notice to Proceed

Major Site General Construction

Asphalt Pavement and finish surfaces	15 Days after Notice to Proceed
Concrete curbs and slabs	15 Days after Notice to Proceed
Grass and Soil Data	15 Days after Notice to Proceed
Irrigation Piping and Accessories	15 Days after Notice to Proceed
Site Lighting	20 Days after Notice to Proceed
Fencing	20 Days after Notice to Proceed
All remaining Submittals with-in	20 days from Notice to Proceed

Construction Milestones

All Prime Contractors

Special consideration should be made to the requirements of the project bid schedule attached in the Specifications. Prime Contractors will be required to man each contract to meet the milestone dates indicated below and/or in the contract bid schedule. All costs should be included in the bid for working multiple shifts, nights, weekends, and holidays to complete each phase of the project.

Time frames indicated, show milestone dates required to be met by all Prime Contractors. These areas, once completed, will be punch-listed and given partial occupancy for the Owner to occupy. Occupying these areas is critical to the Owner. If said dates are not met Liquidated Damages may be assessed and back-charged to the responsible Contractor.

Key Milestone Dates

Golden Hill Elementary School & S.S. Seward Institute School

Parking Lot Re-Paving & Sidewalks:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Golden Hill Elementary School

Kitchen - Grease trap replacement. Kitchen/Serving Line Modifications & New Kitchen Equipment:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

New Toilet Partitions Near Rm.17:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Cafeteria - New A/C: Replace water cooled condenser units with air cooled units:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

S.S. Seward Institute

Gym Fan Rm. - Repair/Re-balance negative air:

- Construction Start: June 28, 2020 | Substantial Completion: August 25, 2020

Boiler Rm. - Replace HW Tanks:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Main Office & Guidance: Replace 7 PTAC Units:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Main Office - Refurbish the A/C Unit:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Library & Computer Lab - Replace the RTU's:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Gym & Cafeteria Lobbies/Cafeteria - Replace the ceilings:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Cafeteria - New A/C:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Continued

Art Rm. 105 - Replace the sink:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

6th Grade Lockers - Replace to Single Tier:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Boy's & Girl's Locker Rms. - Complete Renovation:

- Construction Start: June 28, 2021 | Substantial Completion: August 31, 2021

Golden Hill ES & S.S. Seward Institute Parking Lot Re-Paving

The bid schedule reflects the phasing and overall construction schedule for repaving of both school parking lots. This work is scheduled to start mobilization on or around June 26, 2021 with completion scheduled for August 31, 2021. All work will be performed as per the plans and/or specs.

Golden Hill Elementary School

Projects include:

1. Kitchen - Grease trap replacement. Kitchen/Serving Line Modifications & New Kitchen Equipment.
2. New Toilet Partitions Near Rm.17.
3. Cafeteria - New A/C: Replace water cooled condenser units with air cooled units.

All work will be performed as per the plans and/or specs.

S.S. Seward Institute

Projects include:

1. Gym Fan Rm. - Repair/Re-balance negative air.
2. Boiler Rm. - Replace HW Tanks.
3. Main Office & Guidance: Replace 7 PTAC Units.
4. Library & Computer Lab - Replace the RTU's.
5. Gym & Cafeteria Lobbies/Cafeteria - Replace the ceilings.
6. Cafeteria - New A/C.
7. Art Rm. 105 - Replace the sink.
8. 6th Grade Lockers - Replace to Single Tier.
9. Boy's & Girl's Locker Rms. - Complete Renovation.

All work will be performed as per the plans and/or specs.

SCHOOL OPERATIONS & CONTRACTOR WORK HOURS

This project will affect many areas, which in some cases will remain in operation during construction. During the school session all contract work not effecting the District's Operation may be performed weekdays during the hours of 7:00 am and 4:00 pm. All contract work effecting the Operation of the School must be performed on an after-hours schedule, weekends or school holidays.

Each Prime Contractor may work Saturday & Sundays to make up for lost time (Saturday/Sunday work will be required if necessary to meet deadline) with prior approval from the Owner and after Contractor has verified allowable working hours by town ordinance.

Due to extreme traffic congestion associated with student car and bus transportation, deliveries to any area of the project WILL NOT be allowed during school days from 7:10 a.m. to 7:45 a.m. and 2:00 p.m. to 2:45 p.m.

All Contractors will provide in their base bid (15) fifteen "black out days", per school year, to the construction schedule where no work can take place due to state testing. These dates will be determined by the District and have been incorporated into the milestone dates indicated in the attached bid schedule. Blackout dates for testing will only be required for trades with work that will take place during the academic school year (September 1st- July 1st).

III. SAFETY / LOGISTICS/STORAGE

1. Two weeks after the receipt of the Notice to Proceed, the Prime Contractor for General Construction shall provide a Site Safety/Logistics Plan to the Construction Manager. The site logistics plan should minimally include locations of the eight-foot high temporary fence, traffic plans for deliveries and removals, refuse container locations, crane locations, pick locations, boom radius, and lift locations. This plan shall also show the location of all staging and storage areas, non-rated and fire-rated partitions used to separate construction and school areas, made with plywood and/or gypsum wallboard, etc. The logistical information represented by the construction documents shall serve as a minimal guide.
2. Each prime contractor is to submit their corporate safety policy (2) weeks after notice to proceed. Plan to minimally meet OSHA standards. Each Prime Contractor shall make the participation of their subcontractors in this program mandatory. These Safety Programs should be a detailed Company Policy defining the specifics as to how a safe work environment shall be maintained
3. Each Prime Contractor and Sub Contractors shall schedule weekly safety meetings (Job Site Safety Talks) and submit meeting minutes indicating attendees and topics to the Construction Manager.
4. Each Prime Contractor is to identify in writing to the Construction Manager their "OSHA Competent Person Regarding Safety" Definition. "Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Continued

5. All flagmen required for deliveries to the site are to be furnished by the Prime Contractor responsible for the delivery. Any and all deliveries crossing the site or student traffic areas shall be escorted by flagmen. All flagmen shall wear orange vests. All deliveries shall be scheduled and coordinated with the Construction Manager and the Owner. Delivery blackout periods for bus traffic interference shall be established with the Construction Manager.
6. Smoking, firearms, alcoholic beverages, and indecent photography are expressly prohibited on all school properties. All persons representing Contractors, subcontractors or suppliers shall wear shirts, long pants and other proper attire while on school property. All persons representing Contractors, subcontractors or suppliers shall conduct themselves in a professional manner consistent with the rules and policies of The School District, and the New York State Education Department while on school property or otherwise representing this project.
7. Each Prime Contractor will ensure that all their employees, while on school property, will wear hard hats, high visibility vests, and ID badges at all times. Anyone on site without this safety gear will be escorted off school property.
8. Each Prime Contractor will ensure that every employee working on this project has completed a 10-hour OSHA training course. Any worker that cannot present a 10-hour OASHA safety-training card will be escorted off the property.
9. Food truck vendors for Construction Workers will only be allowed on school property with prior authorization from the School District. The District may allow or discontinue food vendor truck service at any time for any reason.
10. **Identification Badges.** Each Prime Contractor will provide an ID badge for each of their field personnel prior to coming on school property. All workmen shall display the badge on their person while on site, and at all times. Failure to wear identification badge at all times will result in the immediate removal from the jobsite.
11. Each Prime Contractor is responsible for their own storage and personnel trailers at each site. Each Contractor will be required to supply man trailers and storage box trailers as required. All costs related to its delivery, construction, protection, power, etc. is borne by the individual Contractors utilizing space. The Owner WILL NOT PROVIDE STORAGE SPACE. The placement of these trailers will be strictly limited to predetermined locations. Approval of the placement of any trailer or storage box must be received from the Construction Manager.
12. The parking for construction personnel shall be limited to designated parking areas only. Failure to abide by this rule will result in towing of cars at the expense of the Prime Contractor whom employs the individual.
13. All delivery vehicles/trucks/machinery/etc. permitted on site, must be equipped with back-up alarms and enter through the designated access points. Failure to demonstrate this ability will result in cancellation of delivery or stoppage of work. All delays associated with this cancellation will be the responsibility of the

Continued

14. Prime Contractor responsible for the delivery involved.
15. All temporary construction site fences installed by any Prime Contractor shall be installed with a tightly woven, blind screen mesh. This mesh is to be installed on the "construction" side of the fence. The General Contractor will maintain all fencing daily and lock gates at the end of the day.
16. All crane picks, material delivery, etc. must be coordinated so as not to lift over any occupied area of the building. If absolutely necessary, this work shall be done on off hours to insure the safety of the building occupants. Crane location must be carefully chosen to insure the safety of building occupants. Crane pick must also not be conducted during academic hours within 20' of an occupied building.
17. The Owner or Construction Manager reserves the right to have all hoisting equipment periodically inspected by an independent inspector whose findings will be binding. The Prime Contractor at its own expense must make corrections before continuing work. The Owner or Construction Manager will not assume any responsibility for the safe operation of any hoisting equipment by exercising this right. Each Prime Contractor or Sub Contractor shall cooperate with the inspector by allowing time for the inspection. The Prime Contractor shall be notified 24 hours prior to the time of the inspection. These inspections do not release the Prime Contractor of their responsibility to provide all engineering, permits, and inspections as required by OSHA or the SED prior to use of any hoisting equipment.
18. All vehicular traffic (personal vehicles, trucks, equipment, deliveries, etc.) are to use the designated entrances as outlined on the Logistics Drawings. Access by other routes is to be on exception basis only.

IV. SUBMITTALS

1. Each copy of each submittal shall have attached as the cover page the "Submittal Cover Sheet". All information requested in "Section 01 33 00 Submittal Requirements" shall be provided by the respective Contractor. Submittals will be returned without review if the cover sheet is not accurately completed.
2. Each Prime Contractor shall generate a complete "Submittal Log" within one calendar week of the Notice to Proceed. This log is to list all required submittals specific to your trade as detailed in the Project Manual/Specs. See enclosed form for your use. "ROJ" stands for Required on Job to assist your judgment of the time gap between submission, Architect review, fabrication/procurement and on-site need for putting the work item into place.
3. Each Prime Contractor shall review all submissions for completeness. Each Prime Contractor is responsible to stamp all shop drawings prior to submission to the Architect. The Architect will not review any shop drawings unless first reviewed by said Contractor. Bundle similar material submissions for proper review. Use the Architects Submittal cover sheet located in the Specifications
4. All submissions shall be sent electronically to the Architect. Submittals will be processed and stored electronically, with access available to all Prime Contractors for coordination.

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5. Each Prime Contractor shall provide one transmittal for each submission package identifying each unique submission individually. For each submittal with the submission package, the Prime Contractor shall identify the length of the delivery time and the necessary "last date" an item may be received on site. Each Prime Contractor shall keep a log of all submissions in a manner prescribed by the Construction Manager and the attached form. Minimally, the Contractor shall update this submittal log biweekly and provide a copy to the Construction Manager for review and information.
6. Each Prime Contractor shall copy the Construction Manager's Project Manager on all transmittals, correspondence, RFI's and any other documents sent to the Architect, his consultants or the Owner.
7. At the direction of the Construction Manager, the Prime Contractor shall provide copies of either document and/or data files for any requested document on one of the following programs: Microsoft Word, Microsoft Excel, or Primavera's SureTrack - Project Manager 2.0 scheduling program.

V. LINE, LEVELS & GRADE

1. The Prime Contractor for General Construction shall establish a baseline and benchmark system for each building addition, area of renovation or component. This survey work shall be completed by a licensed professional surveyor. The surveyor(s) employed to establish this system or to extend and maintain an existing benchmark system for the work of other trades shall not have less than five years' experience in performing construction surveys similar to the work they will perform for this project. The other Prime Contractors and their subcontractors shall be responsible for extending these lines, levels and grades, and for performing all layouts for their own work. Each Prime Contractor is solely responsible for any damage or loss due to incorrect extension of lines, level or grades in their layout. Each Prime Contractor and their subcontractors shall be responsible for the accuracy with respect to the layout of their work. Any discrepancies or errors in the drawings, perceived by a Prime Contractor or subcontractor, shall be immediately reported to the Construction Manager and Architect. If any corrections are necessary, they shall be executed in accordance with procedures approved by the Construction Manager.
2. Each Prime Contractor and their subcontractors shall be responsible to offset, or to protect, their markings from anything that may disturb them.
3. The Prime General Construction Contractor and all other Contracts will build to existing conditions of the site and joining buildings. To confirm line, level and grade, the Prime General Construction Contractor will employ a licensed NYS surveyor by the end of the project and produce an 'As-Built' drawing including final elevations and boundaries of any structural or earth modifications.
4. In addition to the General Construction Trade, the Site Contractor will be required to hire a NYS Licensed Surveyor to perform existing and finish grade surveys at the new athletic field. The hired surveyor is to follow the same guidelines mention in paragraphs 1-3 of this section.

VI. MANAGEMENT OF WORK

1. Each Prime Contractor shall employ (from one week after Notice to Proceed until punch-list and closeout are complete) at a minimum a full time Project Manager and full time on Site Super. The Project Manager and Site Super shall represent the Prime Contractor. All communications given to the Project Manager or Site Super either verbal or written shall be as binding as if given to the Prime Contractor. Important communications shall be so confirmed in writing.
2. Each Prime Contractor shall provide copies of their daily construction reports to the Construction Manager's Field Superintendent. These reports shall be submitted no later than 10:00am the following workday. The daily reports shall provide detailed information concerning the Prime Contractors' activities and operation only. Daily Construction Reports to the owners' representative detailing manpower and work activities on site. A "Daily Construction" form is attached and shall be used for reporting these said activities. In addition, the Contractors are to submit Two Week Look Ahead schedules at every construction meeting which describes coming work in detail. A "Two Week Look a Head" form is also attached and shall be used to report said activities
3. Each Prime Contractor shall have responsible representation at the **MANDATORY** weekly job meetings held at the Construction Manager's job office from notice to proceed thru close out. These meetings will be held to arrange for a satisfactory coordination of all building trades so as not to impede job progress. Prime Contractors or subcontractors who fail to attend the meetings will be back-charged \$500.00 per each occurrence.
4. Each Prime Contractor shall submit two-week look ahead schedules identifying the anticipated activity, and material needs for all of the work scheduled to be formed by the Prime Contractor and his subcontractors for the identified time period. The Prime Contractor shall keep this schedule current and provide a biweekly report to the Construction Manager concerning the actual performance and activity compared to the two-week look ahead.
5. The MEP Coordination shall follow the guidelines stated below:
 - a. Each Prime Contractor shall have sufficient responsible representatives at mechanical/electrical/plumbing coordination meetings held at a location to be determined. These meetings shall be held as frequently as required by the Construction Manager or any other Prime Contractor. The General Construction Prime Contractor shall also include a representative at these meetings.
 - b. All Contractors are expected to jointly produce coordination drawings. Prime Contractors are to first submit their respective shop drawings for approval, to the Owner's Architect and Engineers in order to make any necessary changes prior to going through the coordination process. The HVAC Contractor shall provide black line mylars showing all of the approved ductwork. The HVAC Contractor shall locate on these mylars all piping in orange pencil lines. The Plumbing Contractor shall locate the plumbing lines on these mylars in blue pencil lines. The Electrical Contractor shall indicate conduit runs in green pencil lines. The General Contractor will have the last coordination review.

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- c. As each coordination drawing is completed, Contractors are to meet with the Owner's Representative and the Architect to review and resolve all identified conflicts on the coordination drawings. Note: for areas without HVAC work, the Mechanical Prime shall provide the necessary mylars with black line. All coordination meetings will be held at the Construction Manager's office.
 - d. It is the responsibility of the Prime Contractor for General Construction to coordinate all points of entry through the foundations, slab penetrations, sleeves, roof openings and penetrations, wall openings and penetrations etc. with the work of all other Contractors, including but not limited to M. E. P. Primes, kitchen equipment, casework and casework accessories.
 - e. It is the responsibility of each Prime Contractor to coordinate with the architectural details and elements, such as soffits, variations in ceiling height and materials, fire/smoke partitions or barriers, folding partition, doors, lockers, and any other general construction items that impact the space above the ceiling or otherwise requiring light framing and/or miscellaneous support or bracing.
6. If any Prime Contractor fails to keep the site safe and clean within four hours of being notified by the Construction Manager either verbally or in writing, the Construction Manager will have this work performed and back charged to the appropriate Prime Contractor at prevailing overtime rates plus 15%. Notice to field personnel is deemed notice to this Prime Contractor.
7. Dust and fume control is essential to the reduction of health risks to the surrounding personnel. Methods of dust control shall include but not be limited to the following:
- a. Adequate ventilation.
 - b. Wetting down.
 - c. Keeping bags of insulating materials, cement, etc. closed.
 - d. Controlled mixing of materials under field conditions.
 - e. Special attention should be utilized in sawing of insulation and certain acoustical materials and storage of materials.
 - f. Job housekeeping must be maintained.
 - g. Advising all personnel of hazardous conditions, including supervisors and workmen.
 - h. Each Prime Contractor shall be responsible for instituting the above policies to insure minimal impact to surrounding occupied areas.
8. Each Prime Contractor shall confine operations on the premises to areas designated by the Construction Manager and permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the Premises with any materials or equipment. The Prime Contractor shall coordinate all of his operations with, and secure approval from, the Construction Manager, before using any portion of the Premises. Field personnel are to be confined to the work area assigned.

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9. Where material is specified to be furnished by others or furnished and delivered only, the Prime Contractor installing the material shall be responsible for scheduling the delivery and receiving, unloading, storing, handling, relocating, hoisting, distribution, laying out and installing this material. Upon receipt by the Prime Contractor installing the material, risk of loss and damage shall be borne by that Contractor.
10. All Prime Contractors and their subcontractors shall allow sufficient time to inspect and accept the work of the previous Contractors. Should any discrepancies be discovered, The Construction Manager shall be notified sufficiently in advance so that corrective action can be agreed to and taken (by all necessary parties) without affecting the progress of any Contractor or the work.
11. All Prime Contractors are advised to exert utmost care and diligence when working in or near any existing buildings or site work which is to remain. The absence of protection around such items shall not excuse the Prime Contractor from his liability to provide protection. Any damages to the existing buildings, sitework or facilities shall be repaired and expensed to the responsible Prime Contractor.
12. Each Prime Contractor shall be solely responsible to remove and replace the existing ceiling tiles and grid in areas of the existing building where their work is required but new ceilings are not scheduled. In the event that the existing ceilings are damaged and cannot be replaced to the satisfaction of the Owner, the responsible Prime Contractor shall be solely responsible for replacing, in kind, the existing ceilings with new tile and grid. A qualified Contractor, acceptable to the Owner, shall perform all ceiling replacements.
13. All disconnect and/or tie-in work involving any utilities that would interfere with the ongoing operations of the Owner shall be completed on an after-hours basis. The performance of this work shall be projected on the required schedules and the Owners Representative is to be notified at least forty-eight hours in advance of commencing with this work. All overtime and standby personnel necessary to complete these tie-ins shall be the responsibility of the Prime Contractor performing the work.

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14. At the same time the Prime Contractor submits their Insurance Certificate they shall also submit to the Construction Manager the labor rates of each category of labor for which he or his subcontractors shall employ (either directly or indirectly). This information shall be itemized in the format shown below.

Contractor's Name					
Contractor's Address					
Contractor's Office Phone					
Contractor's Fax Number					
Contractor's Email Address					
Labor Rate Breakdown					
Worker's Title		Journey man	1.5 Rate	Fore man	1.5 Rate
Base Hourly Rate					
Payroll Tax & Insurance:	% Per Hr				
FICA					
Federal Unemployment					
State					
Workers Compensation					
Disability					
Other (Explanation Required)					
Subtotal					
Benefits:	\$ Per Hr				
Vacation					
Health & Welfare					
Pension					
Annuity					
401K Fund					
Other (Explanation Required)					
Other (Explanation Required)					
Subtotal					
Hourly Labor Rate					

VII. REQUEST FOR INFORMATION (RFIs)

1. Please refer to the specifications for Construction Phase Clarifications-Request For Information from Architect's Office" for a complete explanation of the process and copy of RFI form.

VIII. TESTING/INSPECTIONS

1. If the Architect or Owner determines that any work requires special inspection, testing or approval the Owner's Representative will instruct the Prime Contractor of such special inspection, or testing. If such special inspection or testing reveals a failure of the work to comply with the requirements of the Contract Documents, the Prime Contractor shall bear all costs thereof, including compensation for the Architect's and Owner's Representative's. .
2. Contractor shall furnish incidental labor to:
 - a. Provide access to the work to be tested, sampled, and inspected.
 - b. Obtain and handle samples at the project site or at the source of the product to be tested.
 - c. Facilitate inspections, samplings and tests.
 - d. Coordinate with the Owners Rep and testing lab and submit schedule of required tests one week in advance.
 - e. Coordinate inspections
3. As they relate to the timely prosecution of the work, all Prime Contractors shall coordinate independent testing and inspections. If any Prime Contractor fails to coordinate such inspections and additional costs are incurred to the Owner, the Prime Contractor will be responsible for that inspection cost.
4. **The following is a list of intended inspections:**
 - a. Soil bearing, sub-grade inspection and/or compaction
 - b. Concrete field and plant testing & rebar placement
 - c. Masonry or stone field inspection, mortar sampling, reinforcement placement inspection
 - d. Structural steel field welding, bolting, connections, and metal deck
 - e. Asphalt and sub-base inspection
 - f. Soil compaction, density and sieve analysis testing, soil bearing
 - g. Water and air infiltration for windows
 - h. Roofing, flashing, waterproofing
 - i. Under slab plumbing work
 - j. Firestopping
 - k. Fireproofing
 - l. Asbestos air monitoring
5. ***All material and constructability testing costs will be paid by the General Construction Trade and the Site Construction Trade (Golden Hill Athletic Field) as a part of his bid, associated with work as a part of his contract. This is with exception to environmental testing which will be paid by the Owner for Asbestos abatements.***

6. Architect and Owner's Representative shall be notified forty-eight hours prior to the need of testing, in the event the Contractor does not give proper notification and the work is done with no test, that Contractor will bear all costs for such tests.

IX. CHANGES TO THE WORK

1. Refer to the General Conditions for additional information pertaining to this subject.
2. All change proposals for extra work by the Prime Contractors shall be submitted to the Construction Manager, with a complete labor and material breakdown and on the basis of net difference in quantities. The Owner reserves the right to request adequate back up such as invoices, subcontractor quotes, etc., to substantiate the change order cost. Current labor rates for all trades are to be submitted to the Construction Manager by the respective Prime Contractors at the first scheduled job meeting. When both additions and deductions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increase or decrease. All change requests shall include the following breakdown:
 - a. Materials (itemized breakdown)
 - b. Rental of equipment (itemized breakdown)
 - c. Labor (itemized breakdown)
 - d. Insurance
 - e. **Subtotal**
 - f. Overhead 10%
 - g. **Subtotal**
 - h. Subcontractor work (same as above, subcontractor O & P 10%)
 - i. **Subtotal**
 - j. Profit 5%
 - k. **Subtotal**
 - l. Bond charges 2%
 - m. **Total change order**

X. SCHEDULE OF VALUES/PAYMENTS

1. Within one week after Notice to Proceed, the Prime Contractor shall submit a detailed billing breakdown on the AIA G702/ G703 form for approval by Construction Manager. No payments will be made until such billing breakdown is approved.
2. The schedule of values will be reviewed and adjusted if necessary. Once approved, the schedule of values is to be used for the AIA pay application. The schedule of value will take into account and include at minimum the following items:
 - a. **Bond/insurance based on actual invoice amount**

Continued

- b. Labor and material on line items as applicable
- c. Submittals - 1% of contract sum
- d. Punch list - 1% of contract sum
- e. Close-out documents/warranties - 3% of the contract sum
- f. Meeting Attendance & Meeting Documentation - 2% of the contract sum
- g. Allowances
- h. Approved Alternates
- i. Labor and Material breakdown for each line Item

Note: Punch list value will be dispersed only when the work has been confirmed to be completed 100%.
ALL PAYMENT APPLICATIONS SHALL INCLUDE A 5% RETAINAGE FACTOR.

3. The Owner has elected to require the Prime Contractor to submit releases of liens with respect to all Work previously performed and for which payments were made under a preceding application. Beginning with the second payment requisition and with each subsequent payment requisition, the each Prime Contractor shall furnish to Owner the following documents:
 - a. Labor and/or Materials Affidavit
 - b. Daily and Weekly Wage Affidavit
 - c. Prime Contractor's-Partial Release and Wavier of Lien
4. Monthly Payment Applications for Payments shall be made as per Article 9 of the General Conditions of the Contract

XI. PUNCH LIST:

1. Upon substantial completion of each phase of work, the Prime Contractors are to submit to the Owner/Construction Manager a letter declaring the work is substantial complete. Included with said letter is to be the Contractor's punchlist. Upon the receipt of above, the Construction Manager will schedule with the Owner, Architect, and Contractor a walk through to develop a single final punchlist. This single final punchlist agreed by all parties shall serve as the only punchlist. Upon failure to complete the final punchlist within two weeks from receipt, the Owner reserves the right to complete same and backcharge the costs of material, labor, supervision and other incidental costs.

XII. INSURANCE/INDEMNIFICATION

1. All Prime Contractors must issue a Certificate of Insurance with liability limits as defined in the Construction Documents naming Triton Construction Company, The Architect, and the School District as an 'Additional Insured' in addition to all other parties as stipulated in the General Conditions of the Contract in the project manual.
2. All Prime Contractors agree to indemnify and hold harmless Triton Construction Company, The Architect, the School District, its agents and employees in addition to all other parties as stipulated in the General Conditions of the Contract in the project manual.
3. All Prime Contractors and Sub-Contractors/sub-subcontractor's/vendors/etc. insurance/indemnification shall comply with Article 10 "Insurance" and Article 12 "Indemnification" as specified in the General Conditions of the Contract in the project manual.

Specific Scope Requirements for Each Prime Contractor

Prime Contractor for General Construction (PCGC)

1. This Prime Contractor shall provide, for all the building construction work, all necessary site refuse containers and disposal services to maintain the site in a clean and safe condition. This Prime Contractor shall be responsible for emptying and/or replacing all containers on a regular basis or when full. All containers and disposal services shall be provided by a single entity. This Prime Contractor shall provide sufficient labor to keep the site clean on a daily basis and shall be responsible for providing the daily broom cleaning as necessary to maintain site safety.
2. This Prime Contractor shall coordinate with the; Electrician, Plumber and Mechanical Contractors to allow all Contractors unabated access to the building and surrounding work areas.
3. This Prime Contractor shall provide and maintain temporary chemical toilets for the duration of the project. The quantity of these toilets should be as required to properly maintain sanitary facilities and easy access for the personnel on the job. This quantity shall be a minimum of two toilets per major work area. This requirement shall include all necessary paper products, supplies and services, as well as the maintenance of these toilets until all work is complete and the Owner assumes partial occupancy of the building additions and renovations. As a minimum, this Contractor shall include the pumping and servicing of these toilets twice per week.
4. All Scaffolding or stair towers shall be designed and stamped by a licensed NYS PE. When designing this scaffolding consideration should be given to the environment, scaffolding system being used, means of access, means of tying the scaffolding to the structure, location, length of time to be erected, climate conditions, wrapping/containment of building, purpose of use, loadings, etc. all scaffolding and/ or stair tower access points must be secured while not in use. If and when needed, the scaffolding may be used for access by other Prime Contractors during construction- this contractor will not restrict access by others using the scaffold.
- 5.

6. This Prime Contractor shall provide testing and inspection of the scaffolding on a daily basis and per governing regulation (e.g., OSHA). A log of these inspections are to be kept in the PCGC's job trailer, along with inspections tags that identify the status of the scaffolding (inspection dates, okay to use, caution, danger). Report to the Construction Manager all corrective work required through the course of the project.
7. As shown on the logistics plan, this Prime Contractor shall include in his bid price, all costs to provide an 8' ht. rental type chain link construction fencing and gates. All fencing shall have a tightly woven, blind screen mesh installed on the "construction" side of the fence. Mesh to be dark green or black. When directed by the Construction Manager, this Prime Contractor shall remove and dispose of this fencing and all related materials. Gates for man access shall be passive to the exterior of the jobsite during the event of an emergency but remain closed for un-authorized entry during construction. All gates shall be locked when the site is not active, with a double-keyed system, granting the District access to the site after-hours. Included in his bid price, this Prime Contractor shall allow a 1,000 lf allowance of orange netting, to be used at the direction of the CM, Architect or Owner.
8. This Prime Contractor shall perform its steel erection according to their Site Logistics/Safety Plan. Booming steel over the Existing Building will not be permitted while occupied. Steel erection within 20 feet of an occupied building/space will require after-hours crane picks.
9. This Prime Contractor will repair, replace, correct, or finish grade, topsoil, and seed all areas with-in the construction site that was disturbed by the work of this project.
10. This Prime Contractor shall provide and maintain all temporary plastic barriers, partition walls, doors, hardware and plywood barriers for the duration of the project to separate work areas from public areas and to maintain security, dust, and noise control. Temporary partitions and doors will be painted with 1x coat of primer and 2x coats of paint for esthetics.
11. Construction Signage. The Prime Contractor shall include in his base price all construction signage required by OSHA. At the site fence, "Construction Area keep out", "Hard Hats Required" and "Authorized personal only" signage shall be posted every 25' on site fencing. This Prime Contractor shall reference the logistics plans for each project to include any other signage designated for entry gates. Signs shall be made of either metal or durable PVC to endure the project duration.
12. Professional Cleaning: The PCGC shall provide a professional commercial cleaning service to prepare all areas of interior construction for use and to provide a final cleaning after substantial completion is achieved and after direction to provide such service is received from the Construction Manager. This work shall be completed in cooperation with the building maintenance staff and their respective procedures. As part of this service, the PCGC shall wax all new or repaired floors, and, wash or clean all walls, doors, windows, frames, casework, blinds, unit ventilators, shelves, counters, toilet fixture, sinks, equipment, etc. All work shall be performed in place or on site and does not include sending items out for service or special cleaning operations. Building Services shall provide this Contractor with the necessary paper products, hand soaps, trash liners and other products to fill (one time) any dispensers or accessories in order for these items to be prepared for use.
13. Unless specifically noted on the contract documents, this Prime Contractor will provide all concrete equipment pads as shown on the contract documents. All other primes will provide pad sizes and locations.

14. This Prime Contractor is responsible for protection of finished work. Including but not limited to; floors, walls, and doors. This General Contractor will provide, maintain, and remove the appropriate protection materials necessary to adequately protect his finished product.
15. This Prime Contractor should note there are numerous areas where the existing ceilings are remaining. This Contractor will be required to remove and reinstall any ceilings displaced by installation of this Contractor's Work. If open ceilings are not replaced within a twenty-four hour period after a request by the Construction Manager, either verbal or written, the Construction Manager will have said ceilings reinstalled and all related costs will be back charged to said Contractor.
16. Unless otherwise noted in the construction documents, this Prime Contractor will repair and patch all walls, floors, and ceilings to match adjacent finishes after the removal of interior partitions, ceilings, floors, M.E.P. SP. Conduit, piping and ductwork. This includes all walls and ceilings above finished ceilings or spaces. Each Prime Contractor will cut and cap their own work inside finished walls, floors and ceilings.
17. This Prime Contractor shall provide fire extinguishers for the life of the project, the extinguishers are to be hung and identified as per OSHA requirements (1 per 3000 sq ft, or better). These extinguishers are to be re-charged and inspected for the life of the project.
18. If due to location of fabrication plant, a local storage yard is required, all cost associated with this storage yard including receiving, unloading, storing, shake-out, reloading, and delivery to the site shall be this Prime Contractors' cost.
 - a) The Owner may have an Inspector at the plant during the fabrication period. Appropriate access shall be provided at all times for this individual.
19. Shoring/ Support of Excavation: This Prime Contractor will be responsible for hiring a license NYS PE to design a shoring and underpinning plan in effort to build adjacent to existing structures.
20. Soil Erosion: This Prime Contractor will be responsible to establish and maintain a soil erosion fence around the disturbed site during the entirety of construction, until authorized by the Civil Engineer to remove such provisions. This Prime contractor will also provide erosion control at each existing and new nearby storm basin structure. Reference shall be made to the construction plans & documents for additional Soil Erosion provisions required by this Prime Contractor.
21. Abatement Work: This Prime Contractor will be responsible to hire a qualified and DOL licensed Abatement Contractor to perform the Hazardous Material removal at areas involved. This work will only take place during the summer recess. If the work is unable to be completed by the end of the summer, abatement will only take place during prolong holiday weeks after students return.
22. Under slab MEP Trenching at New Slabs: This Prime contractor will be responsible to coordinate with his subcontractors and other Prime Contractors through the Contract Documents and the Coordination Drawings, for any under-slab piping. This Prime Contractor (PCGC) will be responsible to provide the trenching, bedding, backfill and compaction for such MEP under-slab items. As a single Prime Contractor, the PCGC's subcontractors and other Prime Contractors will be responsible to provide a final layout to the PCGC, prior to trenching. Each MEP contractor will be responsible to level the piping with provided bedding from the PCGC, testing the piping prior to back filling.

23. Trenching at existing slabs: This Prime contractor will be responsible to coordinate with his subcontractors and other Prime Contractors to survey, sawcut, trench, lay bedding, backfill trench, dowel existing slab and place new concrete to be level to receive new floor finishes. Where slabs are receiving new floors, This Prime Contractor (PCGC) will provide any corrective patching to the top-of-slab and install the new finish floor. Where existing flooring is to remain and be patched; this Prime Contractor will also be responsible to match the existing finish, prepare and install new material, at approval of the Architect and CM.
24. This Prime Contractor will provide new ductwork penetrations greater than 12"x12" for the his HVAC subcontractors in walls, ceilings, or floors, as well as any structural support necessary.
25. This Prime Contractor is required to fire stop and/ or smoke stop all walls, floors and ceilings after completion of all their own work., including their subcontractors.

Plumbing Subcontractor (In Contract with PCGC)

1. The Prime Contractor for General Construction (PCGC) shall provide dumpsters for this trade. Each Contractor is responsible for collecting, moving, placing, breaking down boxes and pallets, and disposing rubbish, on a daily basis, all debris from their activities into a dumpster supplied by the PCGC. Each Prime Contractor is responsible to broom clean the areas they worked in at the end of each day.
2. The Subcontractor for Plumbing shall include, as part of his base price, all costs associated with providing one hose bib for temporary water service at each major building addition area (if this hose bib does not already exist). The Prime Contractor for Plumbing shall install these hose bibs at locations designated by the Construction Manager or where needed by the PCGC.
3. The Subcontractor for Plumbing should note there are numerous areas where the existing ceilings are remaining. This Contractor will be required to remove and reinstall any ceilings displaced by installation of this Contractor's Work. If open ceilings are not replaced within a twenty-four hour period after a request by the Construction Manager, either verbal or written, the Construction Manager will have said ceilings reinstalled and all related costs will be back charged to said PCGC.
4. Unless otherwise noted in the construction documents, this Subcontractor will cut and cap their own work inside finished walls, floors and ceilings.
5. Each Subcontractor is required to fire stop and/ or smoke stop all walls, floors and ceilings after completion of all their own work.
6. This Subcontractor is responsible for protection of finished work. This Subcontractor will provide, maintain, and remove the appropriate protection materials necessary to adequately protect his finished product.

Prime Contractor for Mechanical (PCM)

1. The PCGC shall provide dumpsters for this contractor to use for day-to-day rubbish. Each Contractor is responsible for collecting, moving, placing, breaking down boxes and pallets, and disposing rubbish, on a daily basis, all debris from their activities into a dumpster supplied by the PCGC. Each Contractor is responsible to broom clean the areas they worked in at the end of each day. This Prime Contractor will include in his bid price the provision to remove large HVAC equipment from the site, at his own costs, including but not limited to RTUs, Chillers, Cooling Towers, Unit Ventilators, and Air Handlers.
2. This Subcontractor for Mechanical should note there are numerous areas where the existing ceilings are remaining. This Contractor will be required to remove and reinstall any ceilings displaced by installation of this Contractor's work. If open ceilings are not replaced within a twenty-four hour period after a request by the Construction Manager, either verbal or written, the Construction Manager will have said ceilings reinstalled and all related costs will be back charged to said PCGC.
3. Unless otherwise noted in the construction documents, this Subcontractor will cut and cap their own work inside finished walls, floors and ceilings.
4. Each Subcontractor is required to fire stop and/ or smoke stop all walls, floors and ceilings after completion of all their own work.
5. This Subcontractor is responsible for protection of finished work. This Subcontractor will provide, maintain, and remove the appropriate protection materials necessary to adequately protect his finished product.
6. Both louvers openings and duct-work openings in excess 12"x12" in walls, or slabs, will be provided by the PCGC prime contractor at the new additions. This Subcontractor (Mechanical) will be responsible for all other openings, including saw cutting, core-drilling and alike.

Prime Contractor for Electrical (PCE)

1. The Prime Contractor for General Construction (PCGC) shall provide dumpsters. Each Prime Contractor is responsible for collecting, moving, placing, breaking down boxes and pallets, and disposing rubbish, on a daily basis, all debris from their activities into a dumpster supplied by the PCGC. Each Prime Contractor is responsible to broom clean the areas they worked in at the end of each day.
2. The Prime Contractor for Electrical is to temporarily support existing ceiling mounted equipment/devices (i.e., speakers, fire alarm apparatuses, exit signs, wiring, light fixtures, etc.) as required for demolition of existing ceilings until new equipment/devices are installed or existing equipment/device can be permanently remounted in the new ceiling.
3. The Prime Contractor for Electrical shall provide and keep temporary light and power operational for a period of from fifteen minutes before the earliest starting time of the earliest trade, to fifteen minutes after the established quitting time of the trade which stops latest in the evening (fifteen foot candles) throughout the entire building (normal working hours 7:00 am to 4:00 pm).

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This applies to all scheduled workdays, Monday through Saturday inclusive, which are established as regular workdays for any trade engaged in the work, including such days that are holidays for Electricians but are regular workdays for other trades. These services are to be kept operational until the CM determines that they are no longer required for the execution of the work. Temporary light shall consist of a minimum of (1) bulb and cage per 10 square feet of floor space in all spaces no matter of size throughout the existing building spaces being renovated..

4. The Prime Contractor for Electrical shall include in his base price all costs associated with providing and maintaining adequate temporary light and power to all areas of work required by the construction documents. Each major area of work shall be provided with an adequately sized distribution panel for temporary light and power
5. The Prime Contractor for Electrical shall provide temporary power for masonry work, mixers, steel work, or fire proofing work, compressors etc. that may require 220V temporary power. Power is to be provided at each major area of work if required.
6. The Prime Contractor for Electrical should note there are numerous areas where the existing ceilings are remaining. This Contractor will be required to remove and reinstall any ceilings displaced by installation of this Contractor's work. If open ceilings are not replaced within a twenty-four hour period after a request by the Construction Manager, either verbal or written, the Construction Manager will have said ceilings reinstalled and all related costs will be back charged to said Contractor.
7. The Prime Contractor for Electrical shall replace all burned out light bulbs when building is turned over to the owner at substantial completion.
8. This Prime Contractor shall coordinate with the Roofing Contractor, General Contractor, Plumber, and Mechanical Prime Contractors to allow all Contractors unabated access to the building.
9. Unless otherwise noted in the construction documents, this Prime Contractor will cut and cap their own work inside finished walls, floors and ceilings.
10. Each Prime Contractor is required to fire stop and/ or smoke stop all walls, floors and ceilings after completion of all their own work.
11. This Prime Contractor is responsible for protection of finished work. This Prime Contractor will provide, maintain, and remove the appropriate protection materials necessary to adequately protect his finished product.
12. This Prime Contractor will modify all existing Fire Alarm devices that are part of the existing building being renovated, maintain the devices throughout construction, and or disconnect as needed. This Prime Contractor will assure that no troubles exist, by hiring a Fire Alarm vendor who is licensed to modify the existing Fire Alarm system to accept any temporary changes through construction.
13. This Prime Contractor is to develop a separate site-specific electrical service shutdown/upgrade schedule within four weeks after Notice to Proceed. This schedule will be developed in conjunction with the Construction Manager and the Owner. No shutdown/transfer will be permitted at any time without prior written notification.

The Prime Contractor for Electrical shall provide temporary power for all 'others' work ongoing at the site during any electrical shutdown or transfer period that would otherwise deny other Contractors power. No shutdown or transfer shall be allowed during active school hours. Any and all shutdowns must be scheduled on the Owners off days (weekends, holidays). Any shutdown longer than three days will require this Prime Contractor to supply temporary power for the Owner (i.e., generators). The Electrical Prime Contractor shall provide a minimum of forty-eight hours' notice to the Owner and the Construction Manager or any necessary power shutdown.

14. Trenching under slab (New/Existing): This Prime contractor will be responsible to layout all locations for any under slab piping. The Prime Contractor for General Construction will be responsible to include trenching provisions for under-slab work where indicated on the plans at new slab locations. This Prime Contractor (PCP) will lay all piping, leveling piping, test and allow the PCGC to backfill in time not to disturb the overall project schedule. This Prime contractor (PCE) will be responsible to sawcut any existing slabs required to install piping, trench, lay bedding and patch the slab to accept new finishes provide by a skilled tradesman hired by this Prime Contractor.

Prime Contractor for Site Construction (PCSC-ES) – Elementary School Athletic Field

1. The Site Contractor shall provide, for the site work project, all necessary site containers and disposal services to maintain the site in a clean and safe condition. This Prime Contractor shall be responsible for emptying and/or replacing all containers on a regular basis or when full. All containers and disposal services shall be provided by a single entity. Prime Contractor shall provide sufficient labor to keep the site clean on a daily basis and shall be responsible for providing the daily broom cleaning as necessary to maintain site safety.
2. This Prime Contractor shall provide and maintain temporary chemical toilets for his workers for the duration of the project. The quantity of these toilets should be as required to properly maintain sanitary facilities and easy access for the personnel on the job. This quantity shall be a minimum of two toilets per major work area. This requirement shall include all necessary paper products, supplies and services, as well as the maintenance of these toilets until all work is complete and the Owner assumes partial occupancy of the building additions and renovations. As a minimum, this Contractor shall include the pumping and servicing of these toilets twice per week.
3. The existing chain link fence at the Golden Hill Athletic Field can be used to secure the area during construction. At any point where there is no fence in place during the removal and reinstallation of existing and new fence, this Prime Contractor will be responsible to secure the site with orange snow netting -including maintenance- to keep the temporary fencing erect. In addition, this contractor shall allow 1,000lf of orange snow netting for use at the Owner or CM's discretion.
4. Construction Signage: This Prime Contractor shall include 3x large format signs (minimum of 30"x40") made from metal, in defined letters indicating the following:
 - a. Fields are Out of Service until End of Summer 2021.
 - b. No Admittance Allowed from Non-Construction Personnel

Continued

- c. Trespassing on Field/Track will result in the dispatch of Local Police Authority, and may result in potential injury due to site conditions.
 - d. OSHA 10Hr Training Required to Access any Further.
- 5. This Prime Contractor will hire the services of an underground utility surveyor to locate and mark all existing underground utilities and services with-in the Area of Work.
- 6. This Prime Contractor is responsible for protection of finished work. This Prime Contractor will provide, maintain, and remove the appropriate protection materials necessary to adequately protect his finished product.
- 7. Sprinkler Piping: This Prime contractor will provide the removal and reinstallation of existing underground sprinkler piping back to its sources, per the Contract Documents.
- 8. Underground Drainage: This Prime Contractor will include all the costs to provide the removal of existing, and the reinstallation new under-ground drainage. Reference should be made to the Construction Documents.
- 9. Access to field: This Prime Contractor will be using an existing access road that is maintained by the School District. Damage to the asphalt road as a result of this Prime Contractor's work, will need to be repaired by this Prime Contractor prior to the completion of the project.
- 10. This Prime Contractor will repair, replace, correct, or finish grade, topsoil, and seed all areas with-in the construction site that was disturbed by the work of this project.
- 11. This Prime Contractor will use the work area as the material staging and storage area.

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February 19, 2020

Mr. Thomas Andryshak
Florida Union Free School District
S.S. Seward Institute
51 N. Main Street
Florida, NY 10921

**Re: Pre-Construction Survey, Bulk Sampling & Analysis of
Suspect Asbestos Containing Materials
Golden Hill Elementary School
Sampling Dates: October 16 and 17, 2019**

JCB#: 19-44304

Dear Mr. Andryshak:

J.C. Broderick & Associates, Inc. (JCB) performed bulk sampling and analysis of suspect asbestos containing materials (ACM) that may be disturbed by the following proposed scope of work. The proposed scope of work was identified by the architect of record and was understood by JCB to be limited to the following:

Scope of Work:

PHASE 1

- Relocate electrical pull box from boy's restroom floor to a dry location
- Provide indirect connection at kitchen sink
- Replace fire alarm panel, add strobes & carbon monoxide detection as required by code
- Step crack in CMU near cafeteria & gymnasium
- Repair masonry cap at rear exit. Replace metal stairs at loading dock
- Replace windows at 1990 addition. Repair and repoint stone sills
- Mill and replace asphalt top course at entry drive, parking lot & drop off
- Replace damaged / deteriorated sidewalks
- Replace corridor locksets with high security lockdown function type
- Allowance for brick mortar tuckpointing. Replace caulk at masonry control joints
- Replace exterior doors at kitchen and front entry
- New security vestibule

PHASE 2

- Add more loads to the 100 KW generator
- Replace carpet at main office, library & computer room
- Replace the kitchen in-floor grease trap
- Replace water cooled condenser units for the kitchen with air cooled
- Replace kitchen & serving line equipment (partial)
- Replace toilet partitions near room 17
- Paint gym walls and ceiling
- Reconstruction of grass field, clay infields and new parking
- A/C at cafeteria

Additional testing will be required if the scope of work changes or is different than reported above.

Inspection:

The inspection and subsequent bulk sampling were conducted by a New York State Department of Labor (NYS DOL) Licensed Consulting Firm by a certified asbestos inspector. The suspect materials identified were classified into homogenous material areas and then representative sampling of these materials was performed in accordance with the United States Environmental Protection Agency (US EPA) 40 CFR Part 763.86 (AHERA). Copies of JCB's license and certification information are included in the attachment of this report.

Chain of custody forms were prepared for the samples collected. The samples were delivered to EMSL Analytical Laboratories, Inc. (EMSL) for analysis. EMSL is an independent environmental laboratory accredited by the New York State Department of Health, Environmental Laboratory Approval Program and the United States Department of Commerce, National Voluntary Laboratory Approval Program. Copies of EMSL's certifications are included in the attachment of this report. Technical information regarding the methods of analysis are available upon request.

NYS DOL Industrial Code Rule 56-2.1(p) (ICR 56) and US EPA 40 CFR Part 763.8 (AHERA) define an asbestos containing material (ACM) as any material or product which contains more than one percent (1%) of asbestos. In accordance with this definition, the table below summarizes the results of the laboratory analysis reported by EMSL.

Table 1.0			
Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
<i>Confirmed ACBM Expected to be Impacted by the Proposed Scope of Work</i>			
A.	Mastic to 12x12 Floor Tile	Main Entrance Area (at Location of New Security Vestibule)	ASBESTOS
<i>Assumed ACBM Expected/Potential to be Impacted by Proposed Scope of Work</i>			
B.	Electrical Wire Insulation Associated with Pull Box	Boys Bathroom near Main Entrance	Assumed Asbestos-Containing*
C.	Floor Tile / Mastic to Floor Tile	Throughout Building	Assumed Asbestos-Containing*
D.	Floor Fill / Self Leveling Materials	Throughout Building	Assumed Asbestos-Containing*
<i>Non-ACBM Expected/Potential to be Impacted by Proposed Scope of Work</i>			
E.	Gypsum Wall/ Ceiling Board	Original Building – Throughout	Not Asbestos
F.	Joint Compound	Original Building – Throughout	Not Asbestos
G.	Grout to Red Quarry Floor Tile	Kitchen	Not Asbestos
H.	Setting Bed Below Red Quarry Floor Tile	Kitchen	Not Asbestos
I.	In-Floor Grease/Water Trap – Inside Liner	Kitchen	Not Asbestos
J.	In-Floor Grease/Water Trap – Cover Gasket	Kitchen	Not Asbestos
K.	Cove Base (Dark Blue)	Main Office & Library	Not Asbestos
L.	Mastic to Cove Base (Dark Blue)	Main Office & Library	Not Asbestos
M.	Cove Base (Black)	Room 14	Not Asbestos
N.	Mastic to Cove Base (Black)	Room 14	Not Asbestos
O.	Mastic Below Carpeting (Type 1)	Library	Not Asbestos
P.	Mastic Below Carpeting (Type 2)	Room 14	Not Asbestos

Table 1.0 Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
Q.	Mastic Below Carpeting (Type 3)	Main Office	Not Asbestos
R.	Setting Bed Below Ceramic Floor Tile	Boys Bathroom near Main Entrance	Not Asbestos
S.	Grout to Ceramic Floor Tile	Boys Bathroom near Main Entrance	Not Asbestos
T.	Mastic Below Ceramic Floor Tile	Boys & Girls Bathrooms near Room 17	Not Asbestos
U.	Grout to Ceramic Floor Tile	Boys & Girls Bathrooms near Room 17	Not Asbestos
V.	Cove Base (Black)	Main Entrance Area (at Location of New Security Vestibule)	Not Asbestos
W.	Mastic to Cove Base (Black)	Main Entrance Area (at Location of New Security Vestibule)	Not Asbestos
X.	Blue & White Patterned 12x12 Floor Tile	Main Entrance Area (at Location of New Security Vestibule)	Not Asbestos
Y.	Interior Brick Mortar	Main Entrance Area (at Location of New Security Vestibule)	Not Asbestos
Z.	2'x4' Pinhole Fissure Ceiling Tile	Throughout Building	Not Asbestos
AA.	2'x2' Pinhole Ceiling Tile	Throughout Building	Not Asbestos
BB.	2'x2' Pinhole Fissure Ceiling Tile	Throughout Building	Not Asbestos
CC.	2'x4' Splash Fissure Ceiling Tile	Storage Rooms	Not Asbestos
DD.	2'x4' Deep Fissure Ceiling Tile	Slop Sinks	Not Asbestos
EE.	2'x2' Rough Ceiling Tile	Boys & Girls Bathrooms near Room 17	Not Asbestos
FF.	2'x4' Pinhole Ceiling Tile	Band Room	Not Asbestos
GG.	2'x4' Smooth Ceiling Tile	Kitchen	Not Asbestos
HH.	Cinderblock Wall Mortar	Gymnasium	Not Asbestos
II.	Cinderblock Wall Mortar	Cafeteria	Not Asbestos
JJ.	Cinderblock Wall Mortar	Hallway by Gym and Cafeteria	Not Asbestos
KK.	Pipe Joint to Fiberglass Insulation	Hallway Ceiling Plenums	Not Asbestos
LL.	Cinderblock Wall Mortar	Basement	Not Asbestos
MM.	Cementitious Wall Material	Basement	Not Asbestos
NN.	Exterior Brick Mortar	Exterior of Building	Not Asbestos
OO.	Cementitious Material to Exterior Stone Cap	Exterior of Building	Not Asbestos
PP.	Cinderblock Wall Mortar	Exterior at Loading Dock	Not Asbestos
QQ.	Gray Floor Paint	Exterior at Loading Dock	Not Asbestos
RR.	Caulking at Brick Wall	Exterior at Loading Dock	Not Asbestos
SS.	Exterior Door Caulking	Exterior Main Entrance Doors	Not Asbestos
TT.	Exterior Door Caulking	Exterior Kitchen / Storage Doors	Not Asbestos
UU.	Exterior Window Caulking	Original Building Exterior	Not Asbestos
VV.	Expansion Joint Caulking	Original Building Exterior	Not Asbestos
WW.	Asphalt Pavement	Entry Drive / Parking Lot	Not Asbestos
Non-Suspect Materials to be Impacted by Proposed Scope of Work			
XX.	Electrical Wire Insulation Associated with Fire Alarm System	Throughout Building	Non-Suspect Material (All wire insulation is confirmed plastic)
YY.	Kitchen Water-Cooled Condenser Units	Kitchen	Non-Suspect Material
ZZ.	Fiberglass Door Insulation	Exterior Doors at Kitchen	Non-Suspect Material
AAA.	Glass Doors (No Insulation)	Front Entry Doors	Non-Suspect Material

Table. 1.0 Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
<p>*Materials ASSUMED to be asbestos. It should be confirmed if these materials will be impacted by the proposed work.</p> <p>¹ If demolition of bathroom wet-wall is planned, contractor shall consider high potential for damage to assumed ACM and ACM debris due to proximity to the wall being demolished</p> <p>NOTE: Potential of damaged asbestos pipe insulation within ceiling plenum and potential debris on top of ceiling tile. Caution should be exercised within these areas to not disturb asbestos pipe insulation or any debris. If necessary, any disturbance of suspect asbestos containing material must be conducted by a licensed abatement contractor.</p>			

Limitations of Inspection:

Although JCB took great care to identify and sample all suspect asbestos containing materials that may be impacted by the proposed scope of work, areas (spaces) and or suspect building materials may not have been accessible for inspection and/or sampling without causing significant damage to the existing building materials or due to physical access. Such areas and or materials that may not have inspected and or sampled due to these circumstances include, but are not limited to, the following

- Non-fiberglass pipe and pipe fitting insulation in plenum spaces such as ceilings, walls, chases, crawl spaces, etc.
- Suspect Debris within plenum spaces such as ceilings, walls, chases, crawl spaces, etc.
- Plenums above plaster ceilings and behind plaster walls.
- Plenums above spline ceiling tile systems.
- Waterproofing membrane in building cavities and below flooring systems (i.e. slabs, ceramic tile, wood, etc.).
- Mastic behind chalkboards/tack boards/mirrors.
- Electrical wire insulation servicing various equipment (ex. lighting fixtures).
- Flooring materials below existing casework.
- Asbestos heat shield insulation between lighting fixture and ceiling.
- Inaccessible, unknown materials (friable and non-friable) below flooring and roof systems.
- Gasket material associated with mechanical systems and duct work.
- Any suspect debris or presumed contaminated sand (such as within plenums and crawlspaces) is not homogenous and not considered a building material in accordance with ICR 56, therefore it cannot be quantitatively tested for asbestos content.

It is recommended that these materials should be presumed to be present or if possible, access be provided to JCB to inspect these spaces/materials.

Conclusions & Recommendations:

The intent of this asbestos containing materials survey was to sample and analyze only the suspect ACM that will be impacted by the proposed scope of work. This survey was not intended to identify all ACMs associated with the subject building and or the referenced subject spaces. If any other suspect ACM are encountered during the performance of the work, that are not referenced in the attachment of this report, these materials must be assumed as being asbestos containing until sampling and analysis is performed and determined otherwise.

Therefore, the contractor shall be advised that during demolition if any suspicious or suspect asbestos material is encountered during demolition, work shall stop immediately and the contractor shall notify the architect and the material shall be sampled by the school district's environmental consultant for asbestos.

No determination was made by JCB if the materials listed in the table are homogenous throughout the remaining portions of the building. That is, the findings of this inspection are limited to information specifically indicated in the table.

The intent of the table above was to report the building materials that are "asbestos-containing" in accordance with the US EPA and NYS DOL. This report was not intended for compliance with the United States Occupational Safety & Health Administration (OSHA) standards. The contractor is responsible for their own compliance to OSHA and shall refer directly to the laboratory reports. All confirmed asbestos containing materials that are not scheduled to be removed should be implemented into an asbestos management plan.

Any disturbance of any confirmed asbestos or assumed asbestos containing materials must be performed by a licensed contractor and certified handlers in accordance with New York State Industrial Code Rule 56 (NYS ICR 56) and 40 CFR Part 763 and all other applicable federal, state and local regulations. General contractors shall also have properly trained and/or certified workers to work in regulated areas. Regulated areas, include crawl spaces, plenums, fan rooms and boiler rooms and any other area where damaged ACM exists or areas where ACM is likely to be disturbed.

It is recommended the district architect consider including an additional allowance for asbestos abatement work. The allowance shall be used to cover the cost of asbestos abatement work resulting from unforeseen conditions discovered during demolition and beyond the scope of the contract documents.

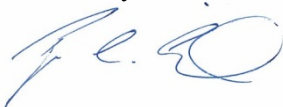
All contractors are responsible for the proper handling, staging and disposal of all hazardous and regulated wastes generated because of the work being performed.

The following project information has been included in the attachments section of this report.

1. Drawings & Photologs
2. Chain of Custody and Laboratory Analysis
3. Laboratory Certifications
4. JCB Certifications

If there are any questions or if more information is needed please feel free to call.

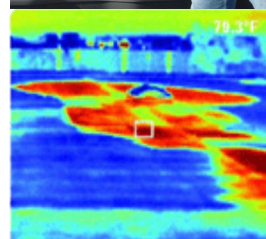
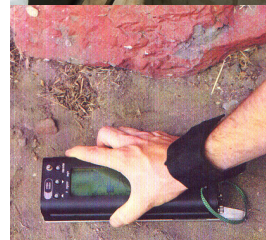
Sincerely,



Ryan Eid

J.C. BRODERICK & ASSOCIATES, INC.

Drawings & Photologs



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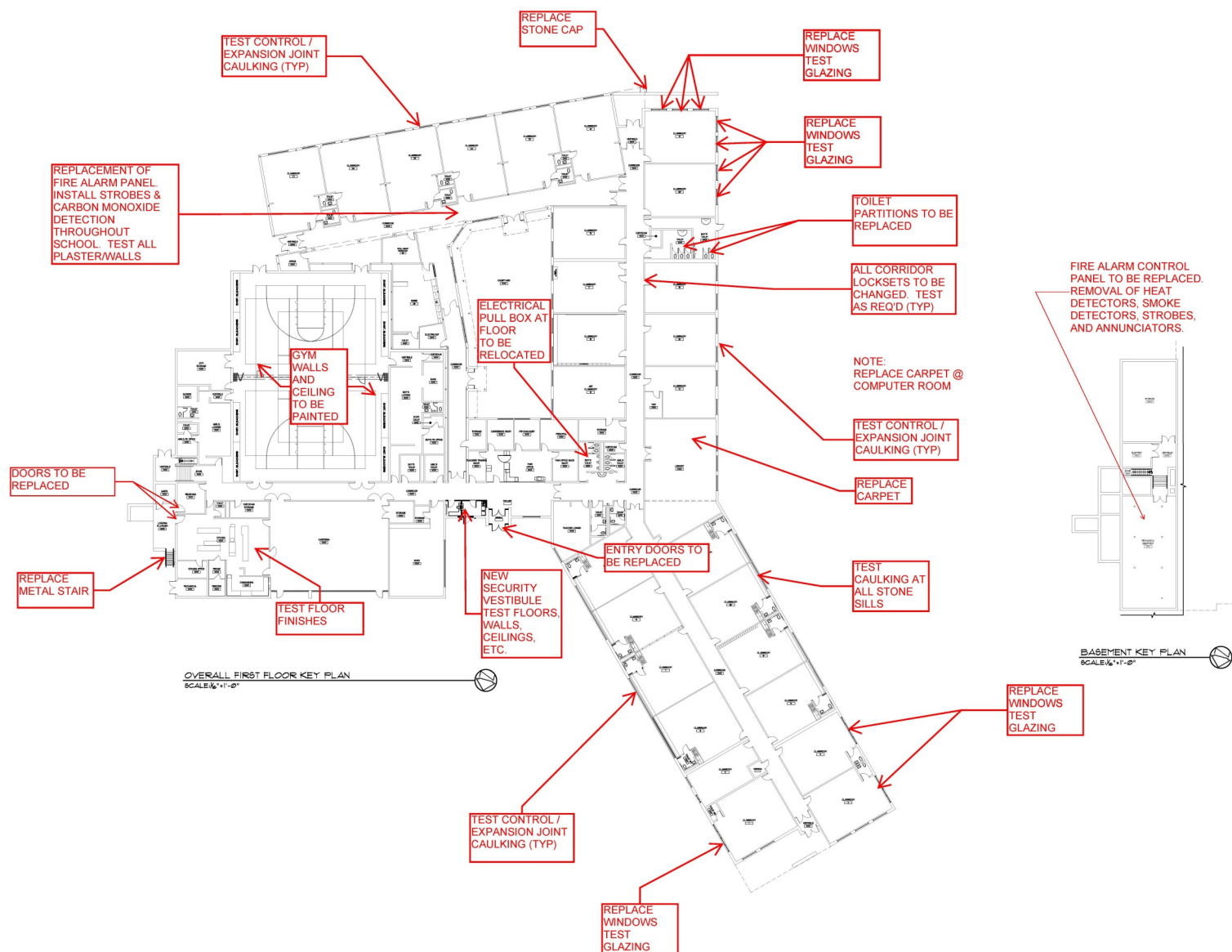
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JCB# 19-44304

**Golden Hill
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**Scope of
Work
Locations**





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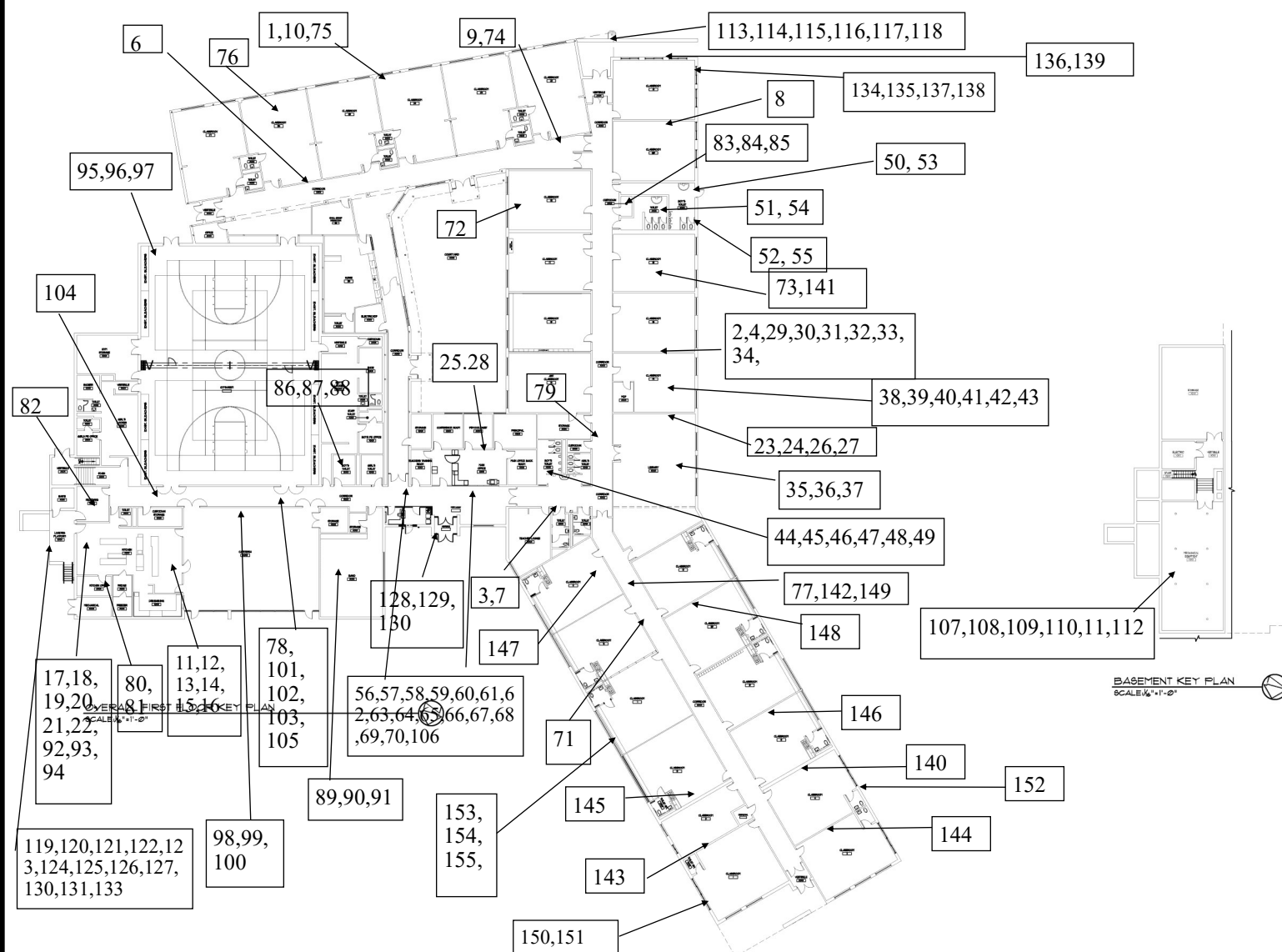
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**Sample
Locations**





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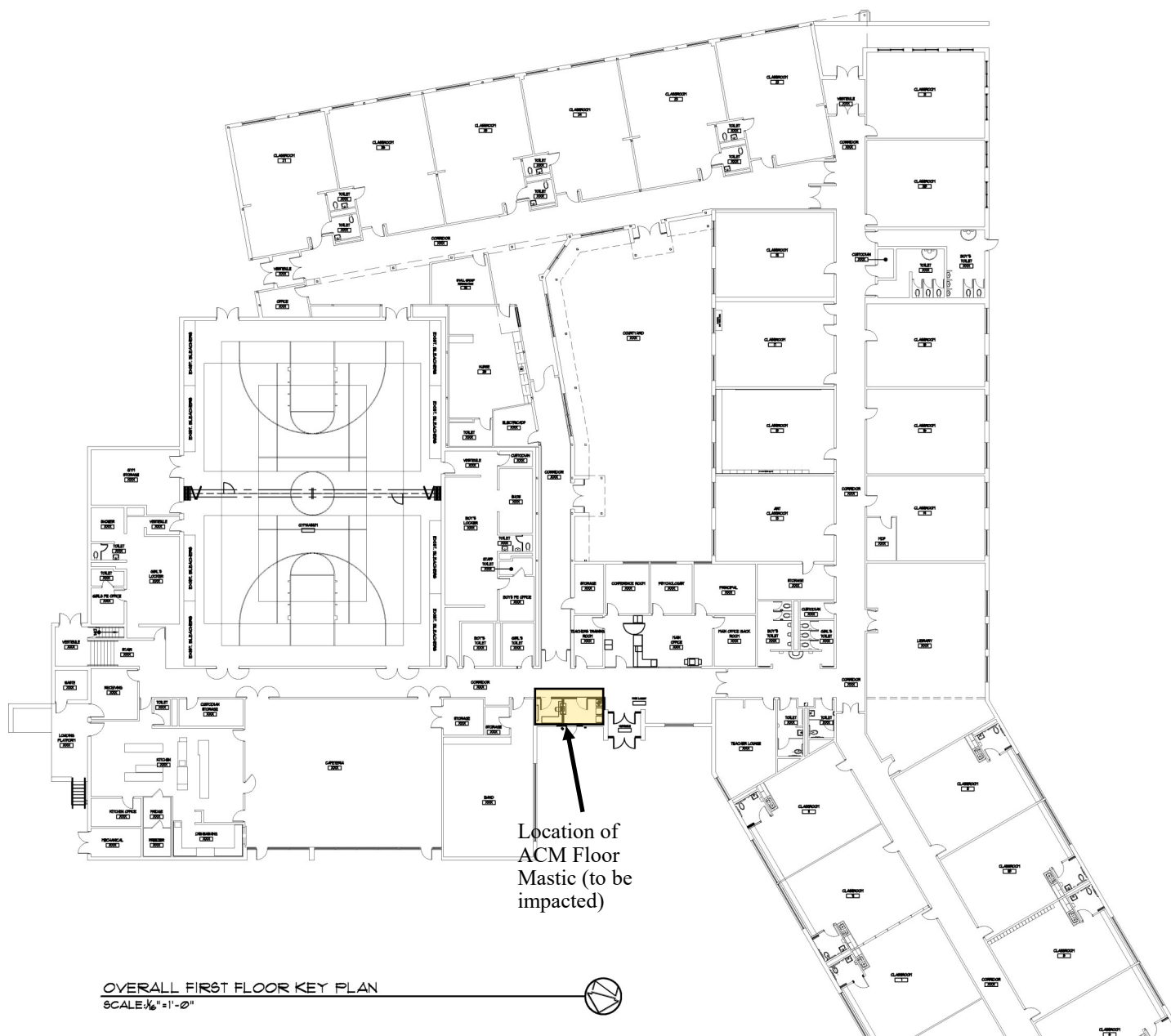
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**Location of
Asbestos
Containing
Materials**



OVERALL FIRST FLOOR KEY PLAN
SCALE: 1/8" = 1'-0"



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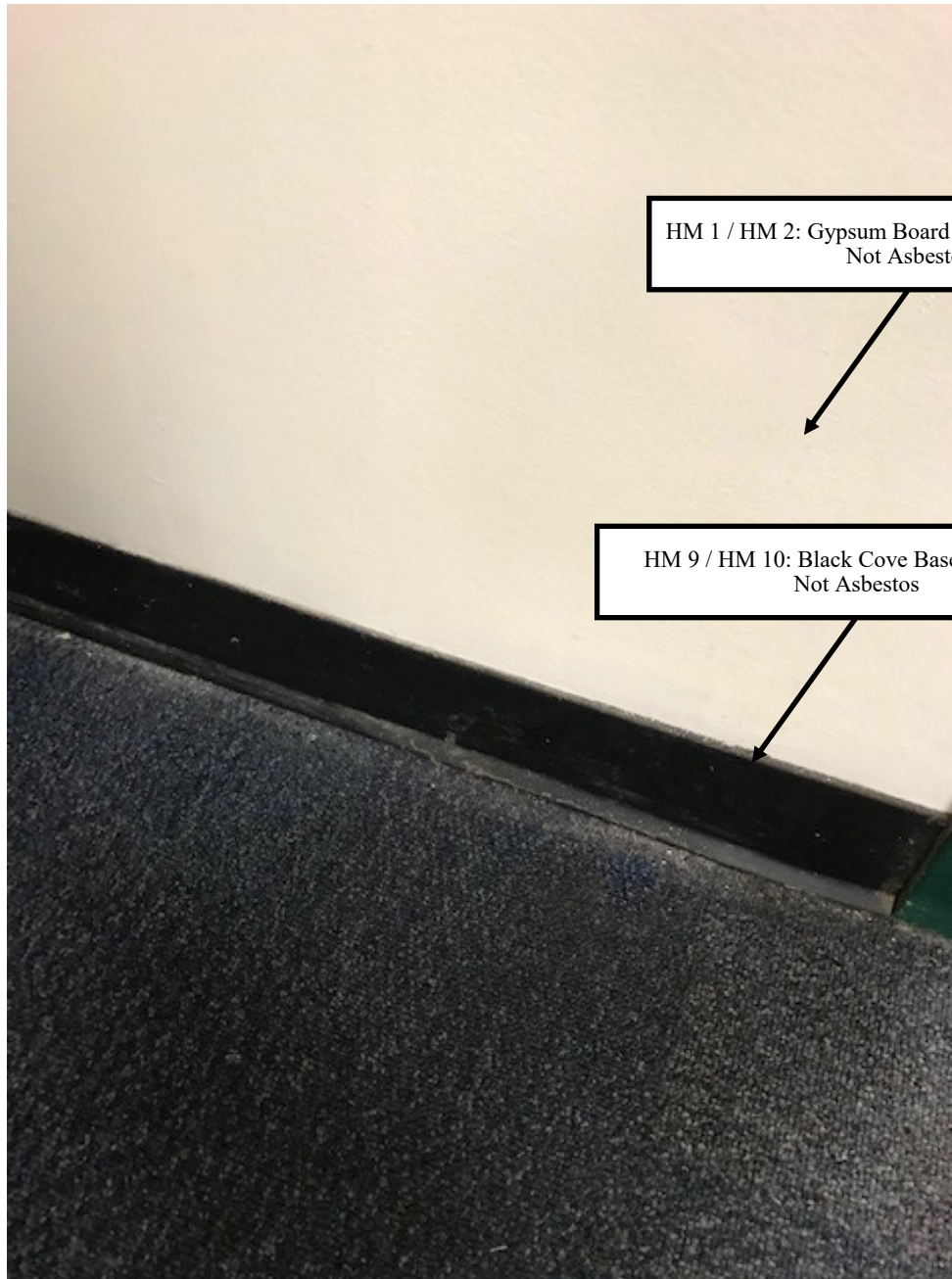
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**Asbestos
Containing
Materials**



**HM 21: Mastic Below 12x12 Floor Tile
ASBESTOS**



HM 1 / HM 2: Gypsum Board and Joint Compound
Not Asbestos

HM 9 / HM 10: Black Cove Base and Mastic
Not Asbestos



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HM 3 / HM 4: Quarry Floor Tile Grout and
Cementitious Floor Base
Not Asbestos

HM 5 / HM 6: Grease Trap Inside Liner / Cover
Gasket
Not Asbestos



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HM 11: Carpet Mastic
Not Asbestos



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HM 12: Carpet Mastic
Not Asbestos



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HM 48- Window Caulking- Not
Asbestos



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HM 49- Expansion Joint Caulking-
Not Asbestos



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HM 43-Door Caulking– Not Asbestos



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HM7/8- Cove Base (Blue) and Mastic- Not
Asbestos



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HM 38– Stone Cap/Cementitious Material–
Not Asbestos

HM 37– Brick Mortar – Not Asbestos

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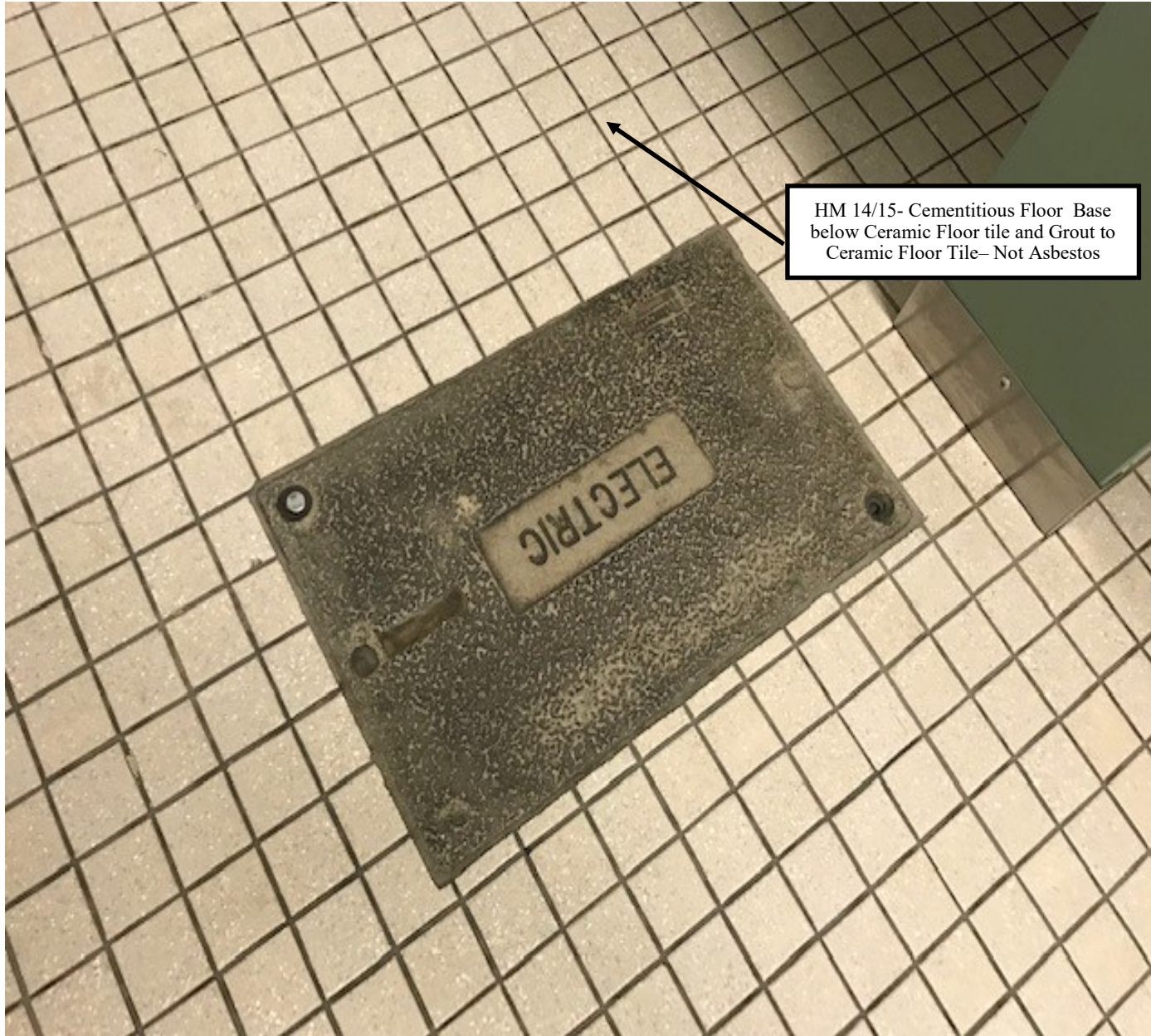
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HM 14/15- Cementitious Floor Base
below Ceramic Floor tile and Grout to
Ceramic Floor Tile- Not Asbestos



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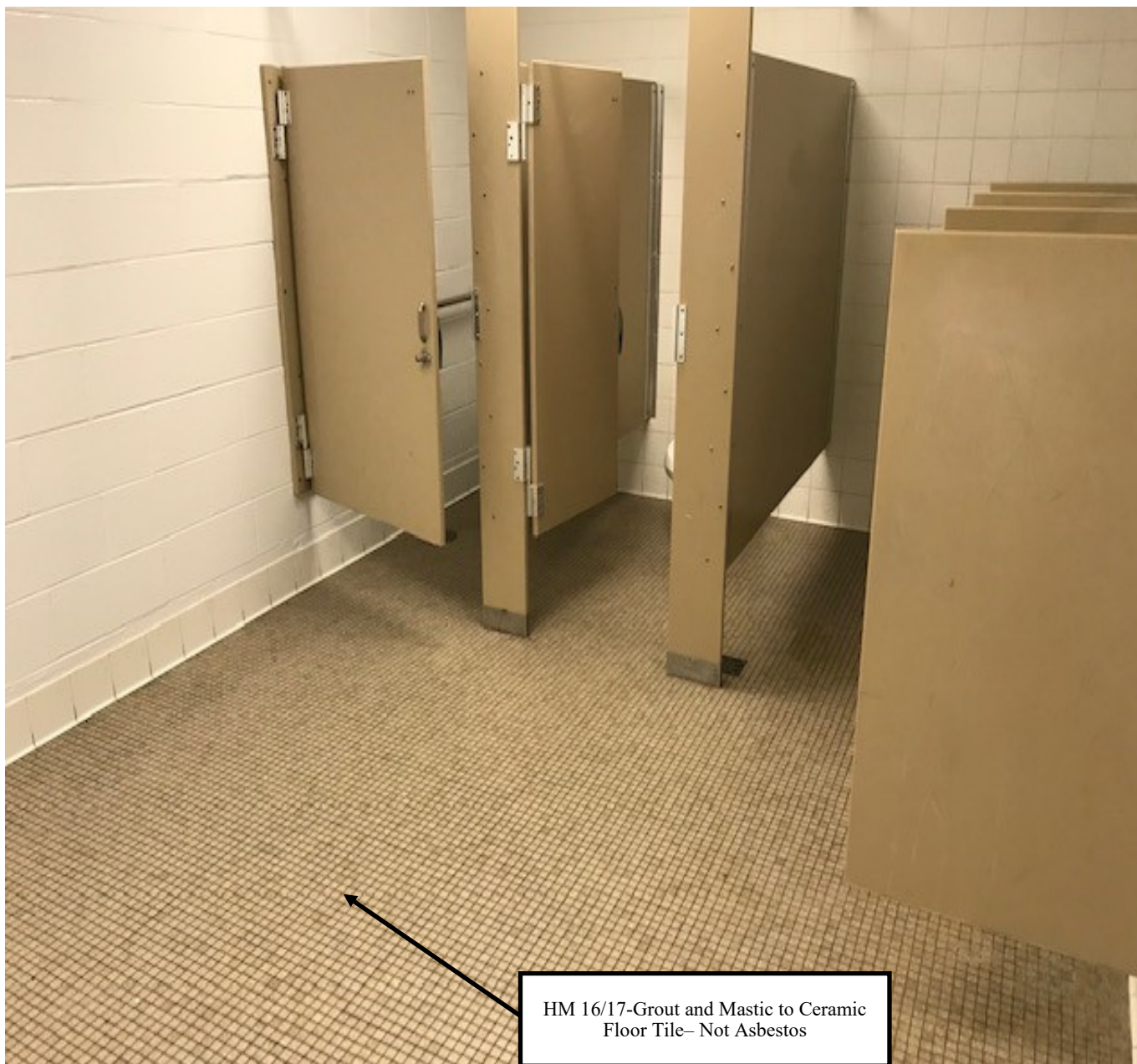
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HM 16/17-Grout and Mastic to Ceramic
Floor Tile- Not Asbestos



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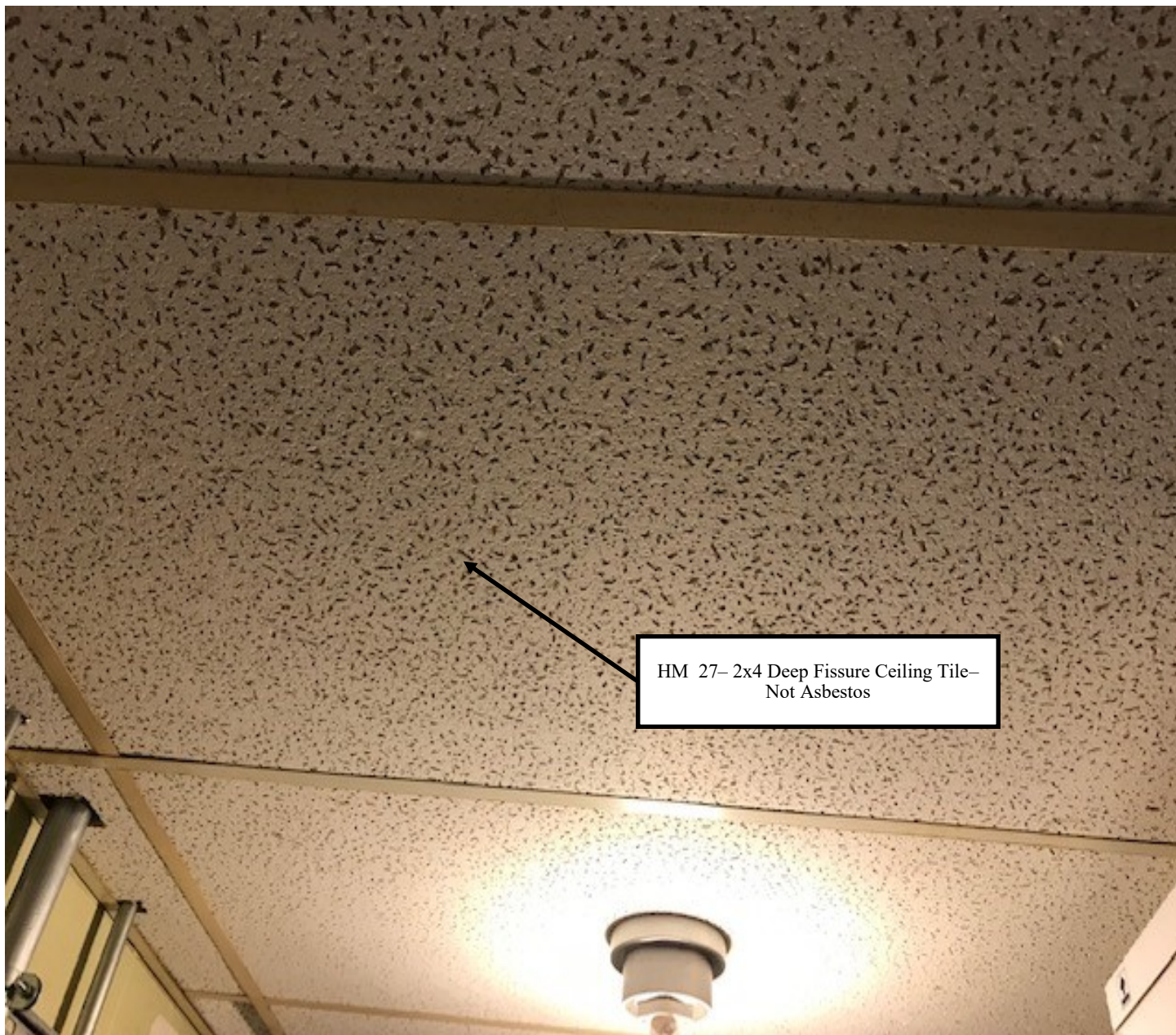
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HM 36- Concrete Wall- Not Asbestos



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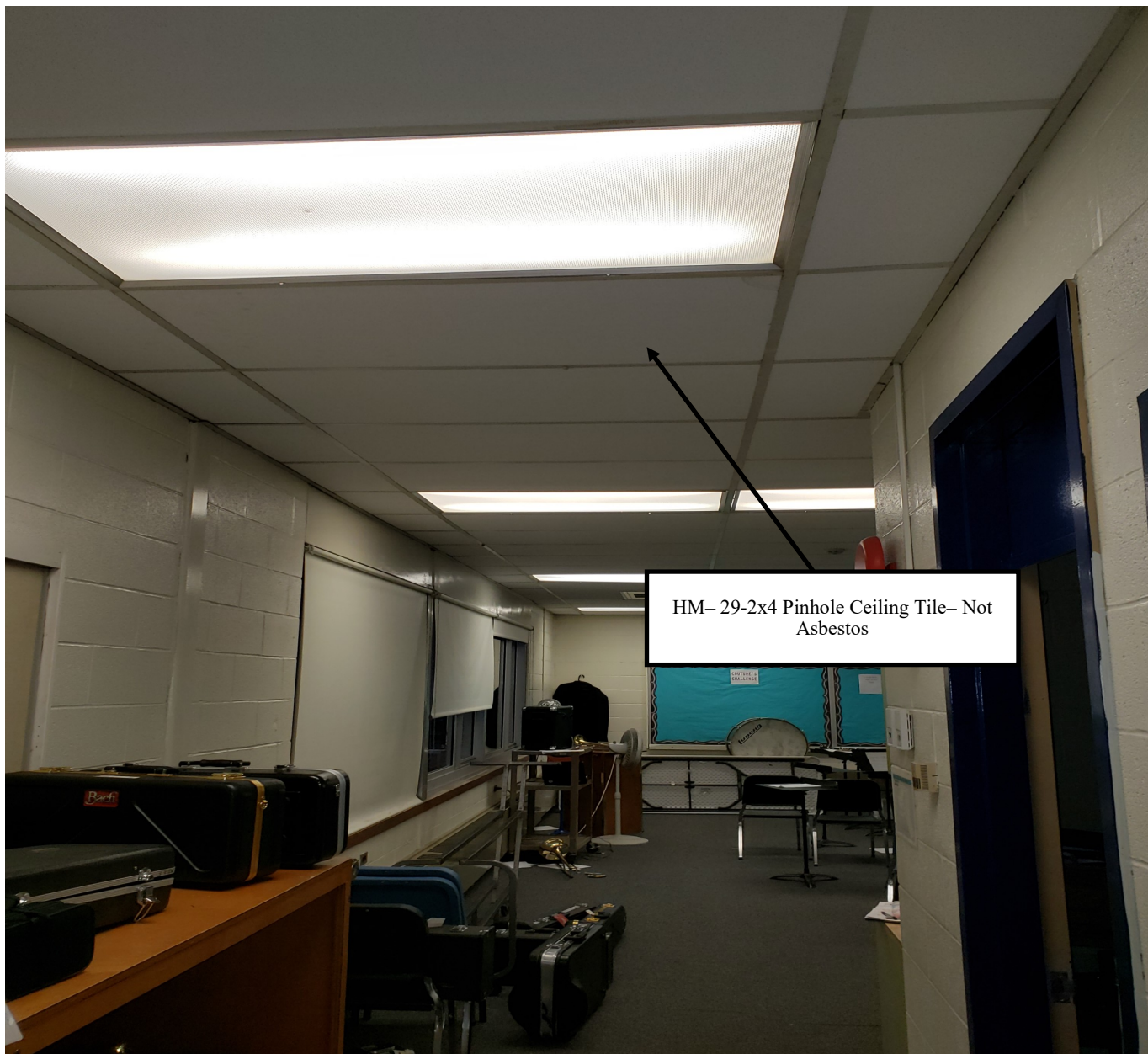
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Photo Log

JCB# 19-44304

**Golden Hill
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FLORIDA UFSD**

**Photo
Log**



HM- 29-2x4 Pinhole Ceiling Tile- Not
Asbestos



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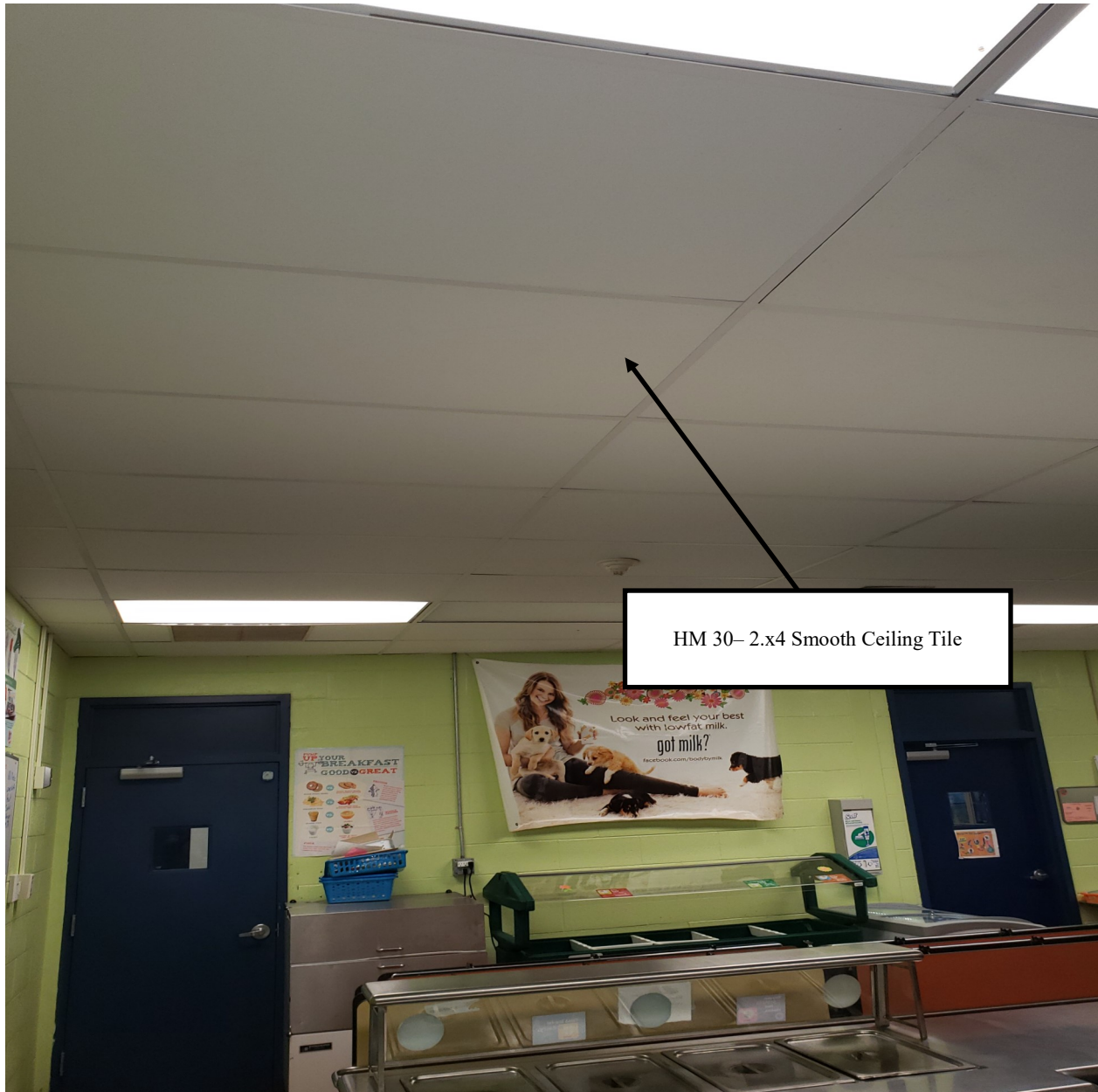
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**Golden Hill
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FLORIDA UFSD**

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Log**



HM 30- 2.x4 Smooth Ceiling Tile



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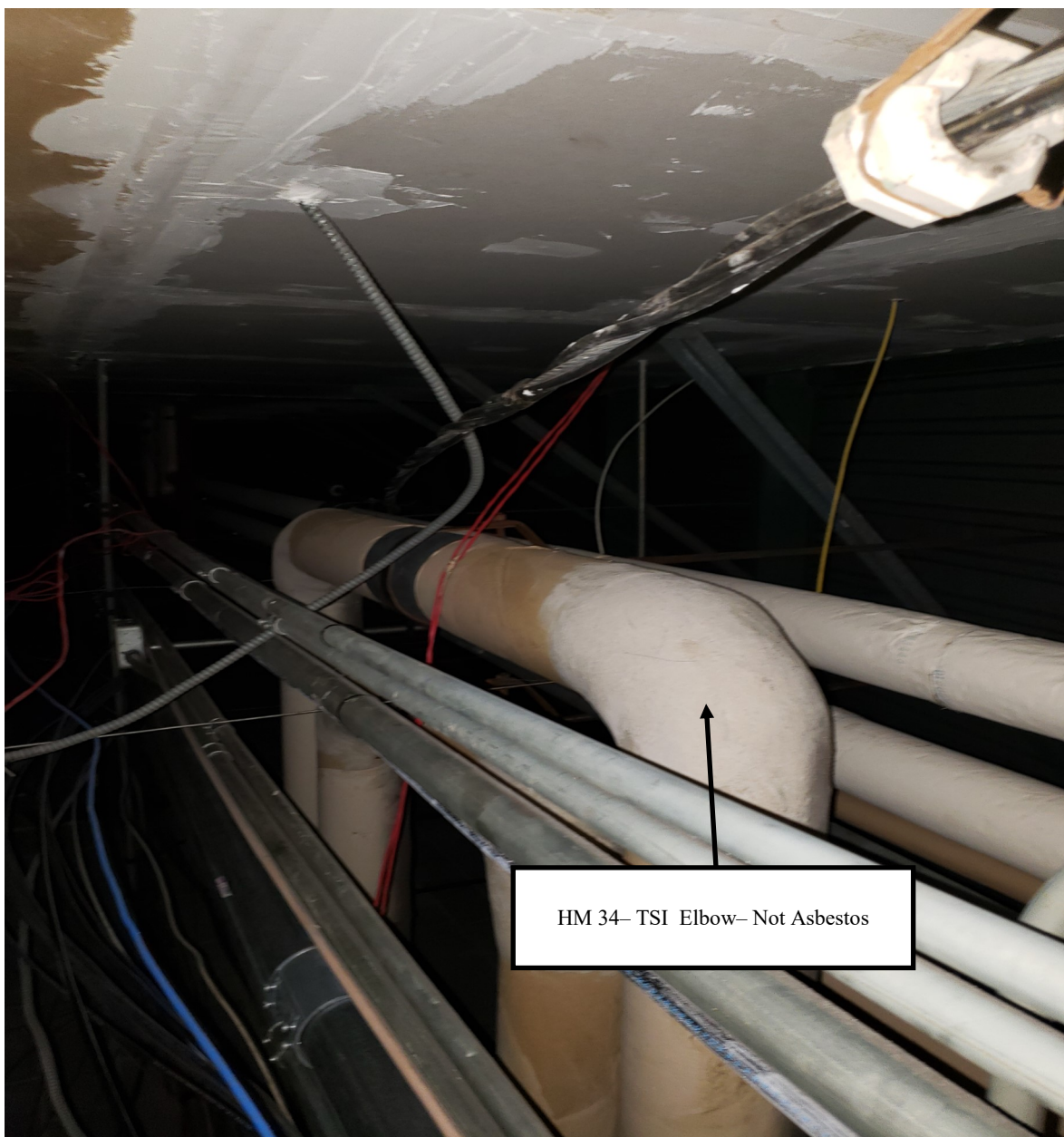
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HM 34- TSI Elbow- Not Asbestos



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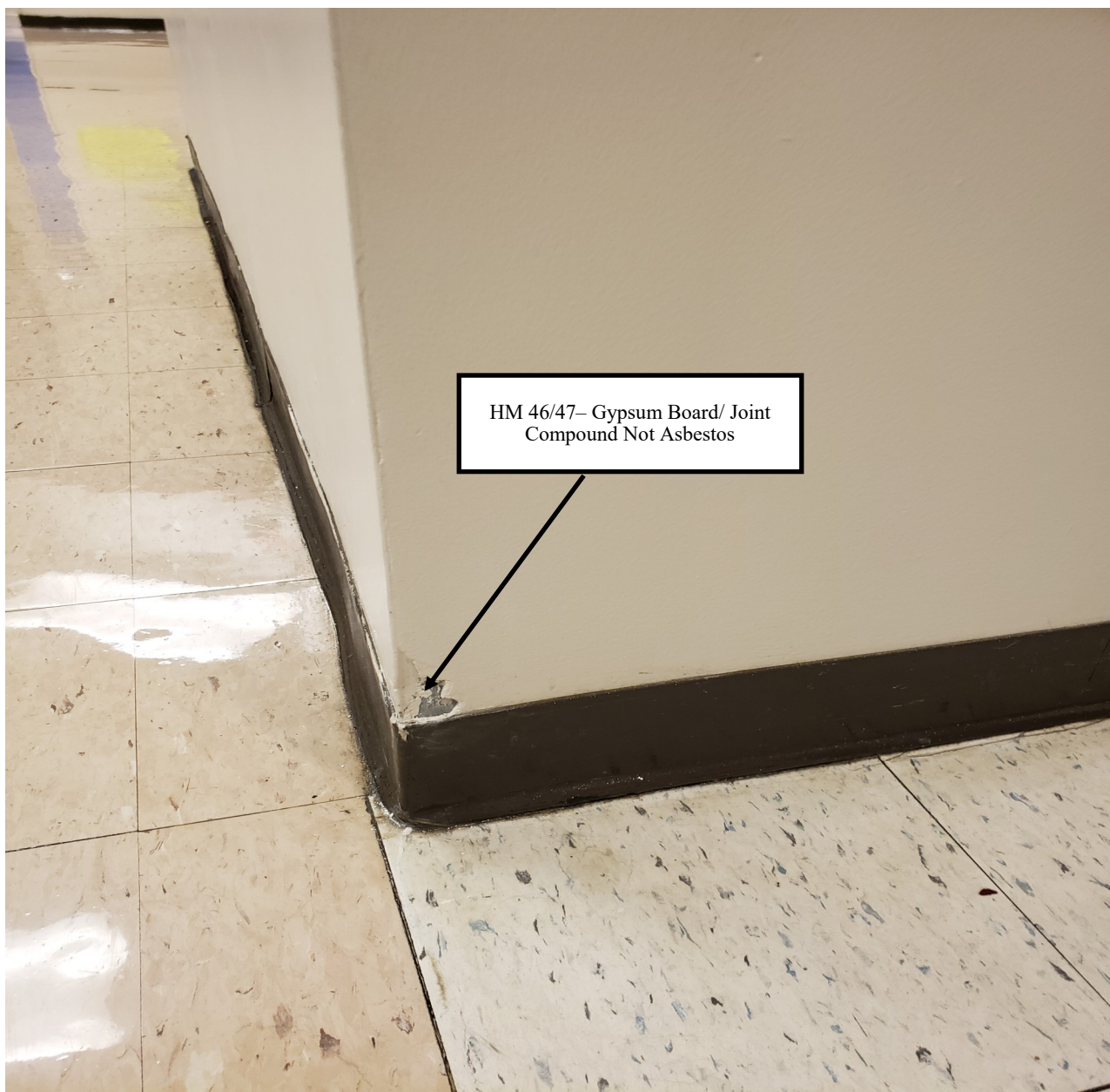
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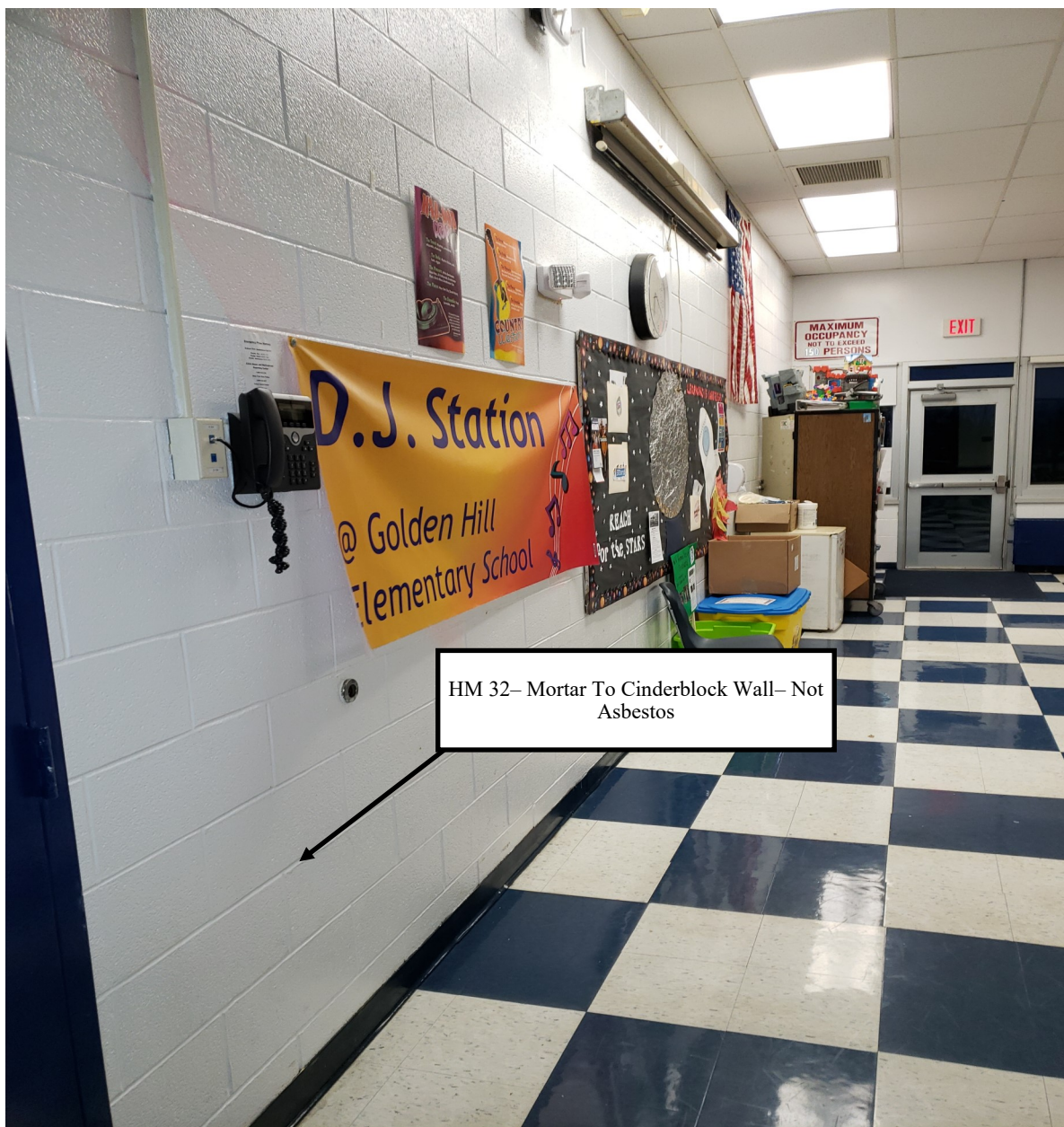
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HM 32- Mortar To Cinderblock Wall- Not Asbestos



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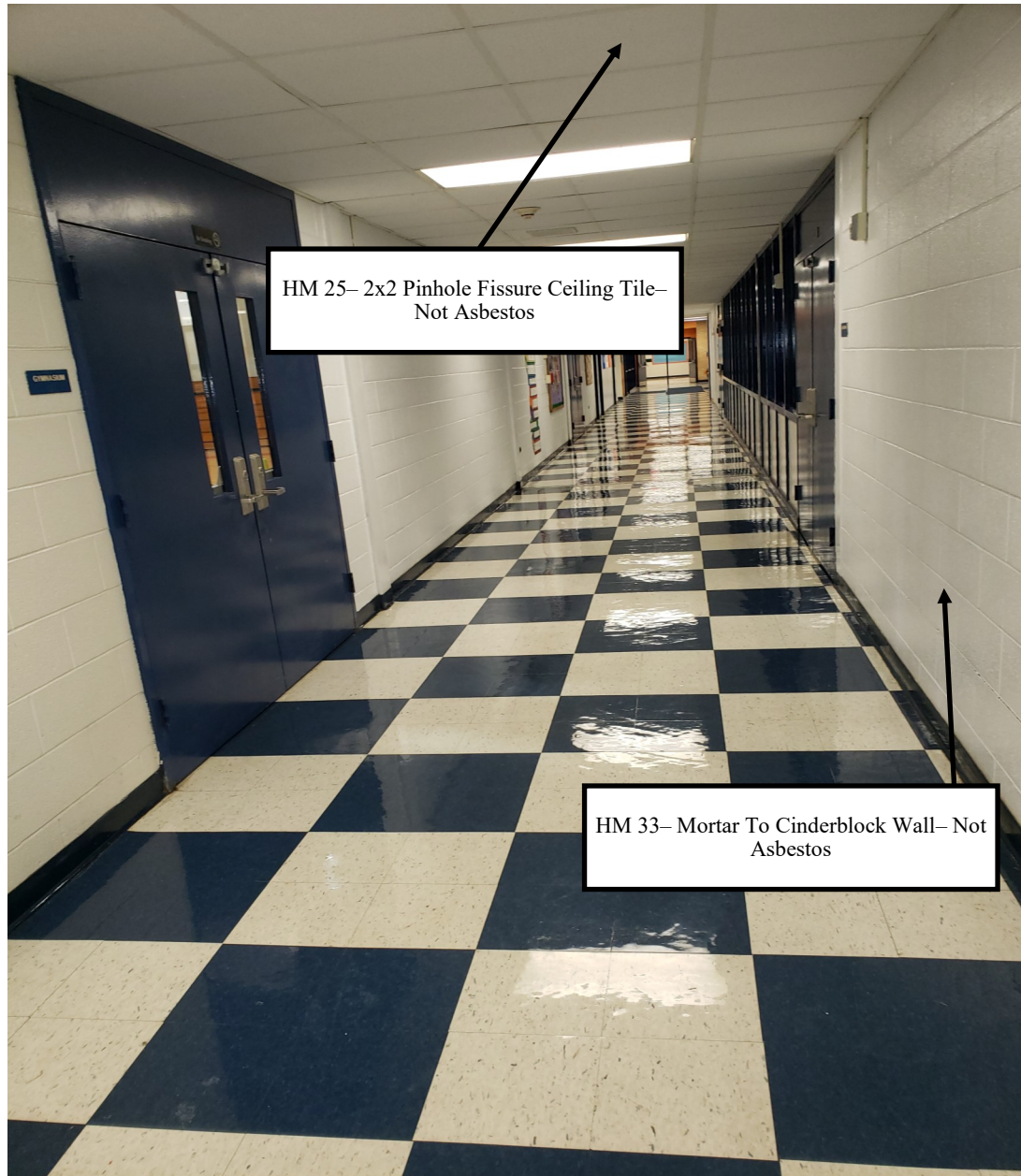
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JCB# 19-44304

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HM 25- 2x2 Pinhole Fissure Ceiling Tile-
Not Asbestos

HM 33- Mortar To Cinderblock Wall- Not
Asbestos



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HM 41– Brick Wall Caulking–
Not Asbestos

HM 40– Grey Floor Paint– Not Asbestos

JCB

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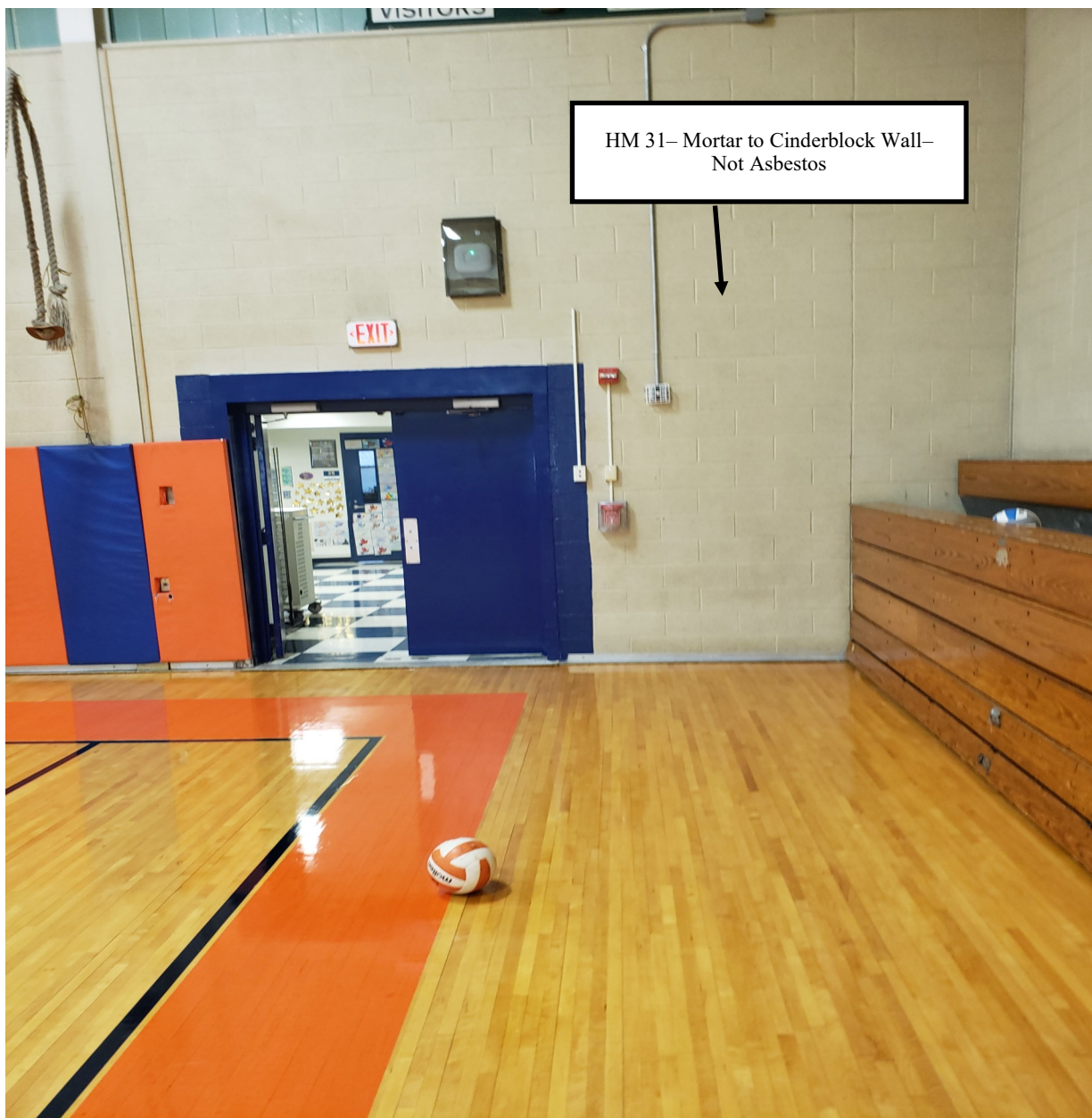
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HM 12- Carpet Mastic/Glue- Not Asbestos



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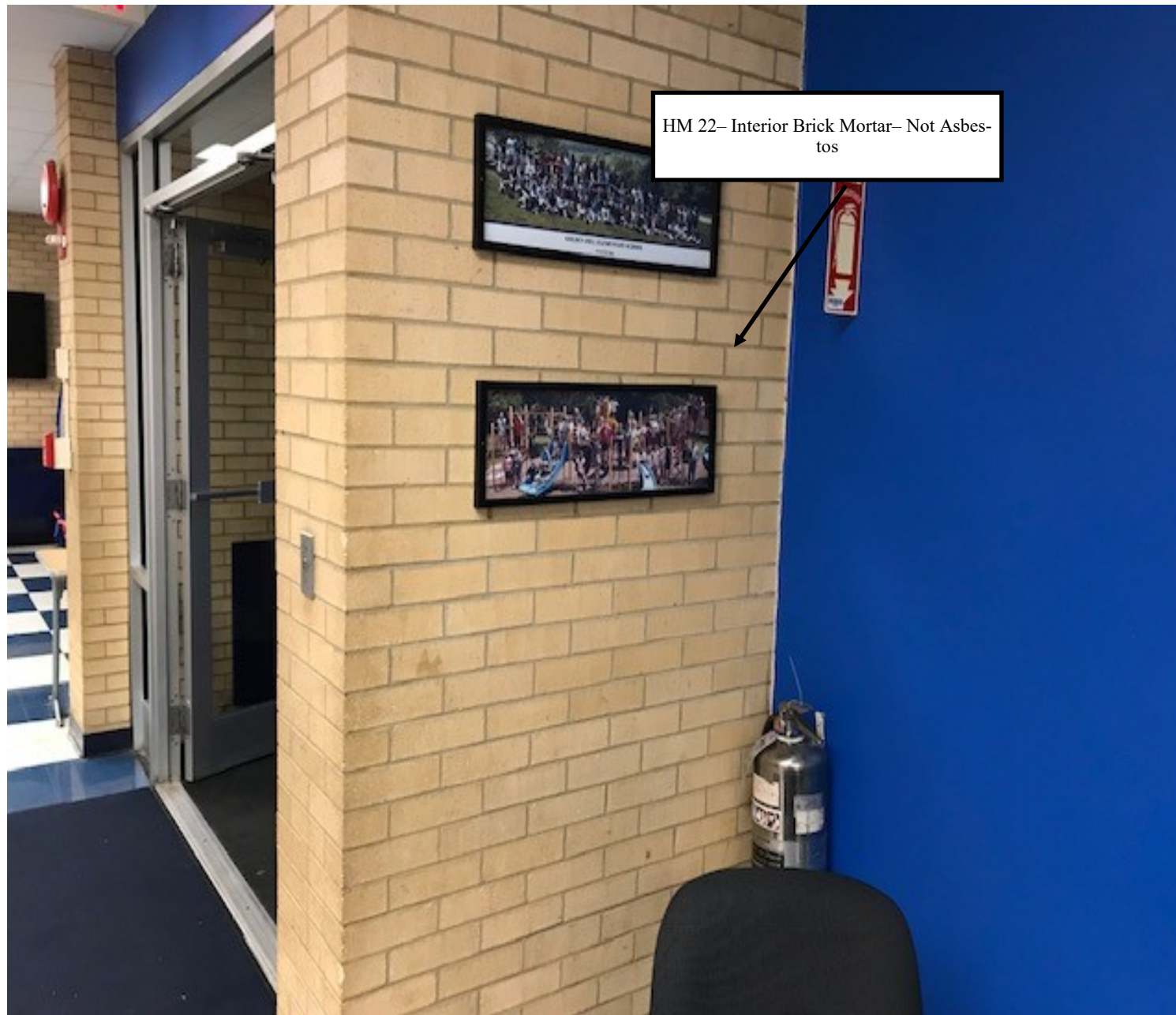
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**Photo
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HM 22- Interior Brick Mortar- Not Asbestos



HM 23- 2x4 Pinhole Fissure Ceiling Tile-
Not Asbestos



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HM 26- 2x4 Splash Fissure Ceiling Tile-
Not Asbestos



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HM 28- 2x2 Rough Ceiling Tile- Not
Asbestos



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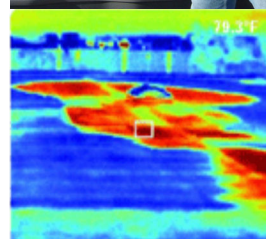
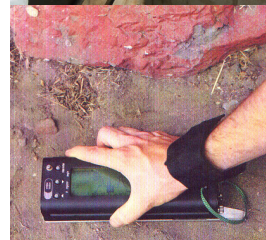
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JCB# 19-44304

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Elementary School
FLORIDA UFSD**

**Photo
Log**

Chain of Custody & Laboratory Analysis



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

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Hauppauge, New York 11788

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PAGE 1 OF 6

R. Eid, J. Gonzales, J. Mrozek

SAMPLER'S SIGN:

EMSL

TURNAROUND TIME:

24 HOUR

MANAGER: R. Eid

061923748 →

SIGNATURE

DATE _____

TIME

RECEIVED BY (PRINT)

SIGNATURE

DATE/

TIME

COMMENTS:	
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Friday 25

Frisk Day

2

100 (100%)

8

BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 2 OF 6

SITE:	Golden Hill Elementary School	SAMPLER'S NAME:	R. Eid, J. Gonzales, J. Mrozek
ADDRESS:	478 Round Hill Rd, Florida, NY	SAMPLER'S SIGN:	
DATE:	10/16/19; 10/17/19	LABORATORY:	EMSL
CLIENT:	Florida Union Free School District	TURNAROUND TIME:	24 HOUR 12 HOUR 6 HOUR OTHER
PROJECT #:	19 - 44304	(CIRCLE ONE)	
<input checked="" type="checkbox"/> ANALYZE EACH MATERIAL TO 1 ST POSITIVE		MANAGER:	R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
7	23	Cove Base (Dark Blue)	Original Building - Library	ACM
	24	↓	Original Building - Library	↓
	25	↓	Original Building - Main Office	↓
8	26	Glue to Dark Blue Cove Base	Original Building - Library	↓
	27	↓	Original Building - Library	↓
	28	↓	Original Building - Main Office	↓
9	29	Cove Base (Black)	Original Building - Room # 14	↓
	30	↓	↓	↓
	31	↓	↓	↓
10	32	Glue to Black Cove Base	↓	↓
	33	↓	↓	↓
	34	↓	↓	↓
11	35	Glue to Carpet	Original Building - Library	↓
	36	↓	↓	↓
	37	↓	↓	↓
12	38	↓	Original Building - Room # 14	↓
	39	↓	↓	↓
	40	↓	↓	↓
13	41	↓	↓	↓
	42	↓	↓	↓
	43	↓	↓	↓
14	44	Cementitious Floor Base below Ceramic Floor Tiles	Original Building - Boys Restroom at Main Entrance	↓
	45	↓	↓	↓
	46	↓	↓	↓

SUBMITTED BY (PRINT)	SIGNATURE	DATE	TIME	SIGNATURE	DATE	TIME
Jacek Mrozek		10/18/19		Michelle DeBello	10/18/19	2:50pm
COMMENTS:	ANALYST (PRINT)			SIGNATURE	DATE	TIME
Please email results to: leid@icbroderick.com	SPENCER				10/18/19	5:46

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0619 23 748

10/19/19 12:24pm

10/19/19 8:58am

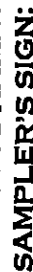
BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 3 OF 6

SITE: Golden Hill Elementary School

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek

ADDRESS: 478 Round Hill Rd, Florida, NY

SAMPLER'S SIGN: 

DATE: 10/16/19; 10/17/19

LABORATORY: EMSL

CLIENT: Florida Union Free School District

TURNAROUND TIME: (CIRCLE ONE)

PROJECT #: 19 - 44304

24 HOUR

12 HOUR

6 HOUR

OTHER

☒ ANALYZE EACH MATERIAL TO 1ST POSITIVE

MANAGER: R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
15	47	Grout to Ceramic Floor Tiles	Original Building - Boys Restroom at Main Entrance	ACM
	48	↓	↓	↓
	49	↓	↓	↓
16	50	Mastic to Ceramic Floor Tiles	Original Building - Boys Restroom at Room # 20	↓
	51	↓	↓	↓
	52	↓	↓	↓
17	53	Grout to Ceramic Floor Tiles	↓	↓
	54	↓	↓	↓
	55	↓	↓	↓
18	56	Cove Base (Black)	Original Building - Hallway at Main Entrance	↓
	57	↓	↓	↓
	58	↓	↓	↓
19	59	Glue to Black Cove Base	↓	↓
	60	↓	↓	↓
	61	↓	↓	↓
20	62	12" X 12" Floor Tiles (Blue)	↓	↓
	63	↓	↓	↓
	64	↓	↓	↓
21	65	Mastic to 12" X 12" Floor Tiles	↓	↓
	66	↓	↓	↓
	67	↓	↓	↓
22	68	Interior Brick Mortar	↓	↓
	69	↓	↓	↓
	70	↓	↓	↓

SUBMITTED BY (PRINT) Jacek Mrozek

SIGNATURE 

DATE 10/18/19

RECEIVED BY (PRINT) Michelle D. Eid

SIGNATURE 

DATE 10/18/19

TIME 3:50pm

COMMENTS:

Please email results to: leid@jcbroderick.com

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10/16/19

10/19/19

10/19/19

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10/15/19

8:58am

10/19/19

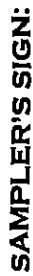
BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 4 OF 6

SITE: Golden Hill Elementary School

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek

ADDRESS: 478 Round Hill Rd, Florida, NY

SAMPLER'S SIGN: 

DATE: 10/16/19; 10/17/19

LABORATORY: EMSL

CLIENT: Florida Union Free School District




TURNAROUND TIME: 24 HOUR 12 HOUR 6 HOUR RUSH OTHER

PROJECT #: 19 - 44304

(CIRCLE ONE)

☒ ANALYZE EACH MATERIAL TO 1ST POSITIVE

MANAGER: R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD		
23	71	2' X 4' Pinhole Fissure Ceiling Tile	Addition Building – Hallway at Room # 9	ACM		
	72	↓	Original Building – Room # 18	↓		
	73	↓	Original Building – Room # 19	↓		
24	74	2' X 2' Pinhole Ceiling Tile	Original Building – Hallway at Room # 22	↓		
	75	↓	Original Building – Room # 24	↓		
	76	↓	Original Building – Room # 26	↓		
25	77	2' X 2' Pinhole Fissure Ceiling Tile	Original Building – Hallway	↓		
	78	↓	Original Building – Hallway at Cafeteria	↓		
	79	↓	Original Building – Slop Sink	↓		
26	80	2' X 4' Splash Fissure Ceiling Tile	Original Building – Storage / Locker Room	↓		
	81	↓	Original Building – Locker Room at Kitchen	↓		
	82	↓	Original Building – Storage Room at Kitchen	↓		
27	83	2' X 4' Deep Fissure Ceiling Tile	Original Building – Slop Sink at Room # 18	↓		
	84	↓	Original Building – Slop Sink at Room # 18	↓		
	85	↓	Original Building – Slop Sink at Room # 18	↓		
28	86	2' X 2' Rough Ceiling Tile	Original Building – Boys Restroom	↓		
	87	↓	Original Building – Boys Restroom	↓		
	88	↓	Original Building – Boys Restroom	↓		
29	89	2' X 4' Pinhole Ceiling Tile	Original Building – Band Room	↓		
	90	↓	Original Building – Band Room	↓		
	91	↓	Original Building – Band Room	↓		
30	92	2' X 4' Smooth Ceiling Tile	Original Building – Kitchen	↓		
	93	↓	Original Building – Kitchen	↓		
	94	↓	Original Building – Kitchen	↓		
SUBMITTED BY (PRINT) Jacek Mrozek		SIGNATURE 	RECEIVED BY (PRINT) Michelle Delto	SIGNATURE 	DATE 10/18/19	TIME 2:50 PM
COMMENTS: Please email results to: leid@icbroderick.com		ANALYST (PRINT) Steve Owen		SIGNATURE 	DATE 10/18/19	TIME 3:40 PM

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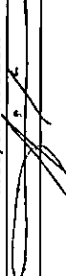
BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 5 OF 6

SITE: Golden Hill Elementary School

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek

ADDRESS: 478 Round Hill Rd, Florida, NY

SAMPLER'S SIGN: 

DATE: 10/16/19; 10/17/19

LABORATORY: EMSL

CLIENT: Florida Union Free School District

TURNAROUND TIME:
(CIRCLE ONE)


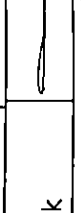
PROJECT #: 19 - 44304

RUSH

OTHER

☒ ANALYZE EACH MATERIAL TO 1ST POSITIVE

MANAGER: R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
31	95	Mortar to Wall Cinder Block	Original Building - Gym	ACM
	96	↓	↓	↓
	97	↓	↓	↓
32	98	↓	Original Building - Cafeteria	↓
	99	↓	↓	↓
	100	↓	↓	↓
33	101	↓	Original Building - Hallway at Cafeteria	↓
	102	↓	↓	↓
	103	↓	↓	↓
34	104	TSI / Elbow	Original Building - Hallway at Kitchen	↓
	105	↓	Original Building - Hallway at Cafeteria	↓
	106	↓	Original Building - Hallway at Main Entrance	↓
35	107	Mortar to Wall Cinder Block	Original Building - Basement	↓
	108	↓	↓	↓
	109	↓	↓	↓
36	110	Concrete Wall	↓	↓
	111	↓	↓	↓
	112	↓	↓	↓
37	113	Brick Mortar to Stone Cap	Original Building / Exterior - Stone Cap	↓
	114	↓	↓	↓
	115	↓	↓	↓
38	116	Stone Cap / Cementitious Material	↓	↓
	117	↓	↓	↓
	118	↓	↓	↓
SUBMITTED BY (PRINT) Jacek Mrozek		SIGNATURE 	RECEIVED BY (PRINT) Michael D. White	SIGNATURE 
COMMENTS: Please email results to: reid@icbroderick.com		DATE 10/18/19	DATE 10/18/19	TIME 2:50 PM

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12:25pm

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10/19/19 2:58pm


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PAGE 6 OF 6

SITE: Golden Hill Elementary School

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek

ADDRESS: 478 Round Hill Rd, Florida, NY

SAMPLER'S SIGN: 

DATE: 10/16/19; 10/17/19

LABORATORY: EMSL

CLIENT: Florida Union Free School District

TURNAROUND TIME: 24 HOUR

OTHER




PROJECT #: 19 - 44304

(CIRCLE ONE)

☒ ANALYZE EACH MATERIAL TO 1ST POSITIVE

MANAGER: R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
39	119	Mortar to Wall Cinder Block	Original Building / Exterior - Loading Dock (Metal Stair)	ACM
	120	↓	↓	↓
	121	↓	↓	↓
40	122	Floor Paint (Gray)	↓	↓
	123	↓	↓	↓
	124	↓	↓	↓
41	125	Brick Wall Caulking	↓	↓
	126	↓	↓	↓
	127	↓	↓	↓
42	128	Door Caulking	Original Building / Exterior - Main Entrance	↓
	129	↓	↓	↓
	130	↓	↓	↓
43	131	↓	Original Building / Exterior - Kitchen/Storage Door	↓
	132	↓	↓	↓
	133	↓	↓	↓
44	134	Window Caulking	Original Building / Exterior - West Elevation	↓
	135	↓	Original Building / Exterior - West Elevation	↓
	136	↓	Original Building / Exterior - South Elevation	↓
45	137	Expansion Joint Caulking	Original Building / Exterior - West Elevation	↓
	138	↓	Original Building / Exterior - West Elevation	↓
	139	↓	Original Building / Exterior - South Elevation	↓

SUBMITTED BY (PRINT) Jacek Mrozek	SIGNATURE 	DATE 10/18/19	RECEIVED BY (PRINT) Michelle Mrozek	SIGNATURE 	DATE 10/18/19	TIME 2:50 PM
			ANALYST (PRINT) Sara Riva	SIGNATURE 	DATE 10/17/19	TIME 2:50 PM

COMMENTS:
Please email results to: reid@jcbroderick.com

J.C. BRODERICK & ASSOCIATE 1775 Expressway Drive North • HAUPPAUGE • NEW YORK, 11788 • PHONE: (631) 584-5492 • FAX: (631) 584-3395 8:58 am

10/19/19 10/19/19 12:29 pm

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PAGE 1 OF 1




R. Eid, J. Gonzales, J. Mrozek

[Signature]

EMSL

<u>24 HOUR</u>	12 HOUR	6 HOUR
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MANAGER: R. Eid

SUBMITTED BY (PRINT)	SIGNATURE	DATE	TIME	RECEIVED BY (PRINT)	SIGNATURE	DATE	TIME
Jacek Mrozek		10/18/19				10-18-19	8:00 AM
COMMENTS: please email results to: telid@cbroderick.com							

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1775 Expressway Drive North ♦ HAUPPAUGE ♦ NEW YORK, 11788 ♦ PHONE: (631) 584-5192 ♦ FAX: (631) 584-3395

Only 10/19/19 8:57 AM

10.19.19



EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Phone/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / carleplacelab@emsl.com

EMSL Order: 061923748

Customer ID: JCBR50

Customer PO:

Project ID:

Attention: Ryan Eid
J.C. Broderick & Associates
1775 Expressway Drive North, Suite 1
Hauppauge, NY 11788

Phone: (631) 584-5492
Fax:
Received: 10/18/2019 2:50 PM
Analysis Date: 10/18/2019 - 10/19/2019
Collected: 10/16/2019

Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1-1 061923748-0001	Original Building - Room 24 - Drywall / Sheetrock	White Non-Fibrous Homogeneous	1% Cellulose <1% Glass	9% Ca Carbonate 85% Gypsum 5% Non-fibrous (Other)	None Detected
1-2 061923748-0002	Original Building - Room 14 - Drywall / Sheetrock	White Non-Fibrous Homogeneous	1% Cellulose	29% Ca Carbonate 65% Gypsum 5% Non-fibrous (Other)	None Detected
1-3 061923748-0003	Original Building - Hallway at Women's Restroom - Drywall / Sheetrock	Gray Non-Fibrous Homogeneous	2% Cellulose	60% Gypsum 38% Non-fibrous (Other)	None Detected
2-4 061923748-0004	Original Building - Room 14 - Wall Joint Compound	White Non-Fibrous Homogeneous		79% Ca Carbonate 6% Mica 15% Non-fibrous (Other)	None Detected
2-5 061923748-0005	Original Building - Hallway / Column at Room 27 - Wall Joint Compound	White Non-Fibrous Homogeneous		72% Ca Carbonate 8% Mica 20% Non-fibrous (Other)	None Detected
2-6 061923748-0006	Original Building - Hallway at Room 26 - Wall Joint Compound	White Non-Fibrous Homogeneous		84% Ca Carbonate 6% Mica 10% Non-fibrous (Other)	None Detected
2-7 061923748-0007	Original Building - Hallway at Women's Restroom - Wall Joint Compound	White Non-Fibrous Homogeneous		79% Ca Carbonate 6% Mica 15% Non-fibrous (Other)	None Detected
2-8 061923748-0008	Original Building - Room 20 - Wall Joint Compound	White Non-Fibrous Homogeneous		74% Ca Carbonate 6% Mica 20% Non-fibrous (Other)	None Detected
2-9 061923748-0009	Original Building - Hallway at Room 22 - Wall Joint Compound	White Non-Fibrous Homogeneous		81% Ca Carbonate 4% Mica 15% Non-fibrous (Other)	None Detected
2-10 061923748-0010	Original Building - Room 24 - Wall Joint Compound	White Non-Fibrous Homogeneous		74% Ca Carbonate 6% Mica 20% Non-fibrous (Other)	None Detected

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Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 10/19/2019 17:08:34



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Received: 10/18/2019 2:50 PM
Analysis Date: 10/18/2019 - 10/19/2019
Collected: 10/16/2019

Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
3-11 061923748-0011	Original Building - Kitchen - Grout to Quarry Floor Tiles	Gray Non-Fibrous Homogeneous		45% Quartz 25% Ca Carbonate 30% Non-fibrous (Other)	None Detected
3-12 061923748-0012	Original Building - Kitchen - Grout to Quarry Floor Tiles	Gray Non-Fibrous Homogeneous		55% Quartz 20% Ca Carbonate 25% Non-fibrous (Other)	None Detected
3-13 061923748-0013	Original Building - Kitchen - Grout to Quarry Floor Tiles	Brown Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
4-14 061923748-0014	Original Building - Kitchen - Cementitious Floor Base below Quarry Floor Tiles	Gray Non-Fibrous Homogeneous		50% Quartz 20% Ca Carbonate 30% Non-fibrous (Other)	None Detected
4-15 061923748-0015	Original Building - Kitchen - Cementitious Floor Base below Quarry Floor Tiles	Gray Non-Fibrous Homogeneous		55% Quartz 20% Ca Carbonate 25% Non-fibrous (Other)	None Detected
4-16 061923748-0016	Original Building - Kitchen - Cementitious Floor Base below Quarry Floor Tiles	Brown/Gray Non-Fibrous Homogeneous		30% Quartz 50% Ca Carbonate 20% Non-fibrous (Other)	None Detected
14-44 061923748-0044	Original Building - Boys Restroom at Main Entrance - Cementitious Floor Base below Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		55% Quartz 25% Ca Carbonate 20% Non-fibrous (Other)	None Detected
14-45 061923748-0045	Original Building - Boys Restroom at Main Entrance - Cementitious Floor Base below Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project
#:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
14-46 061923748-0046	Original Building - Boys Restroom at Main Entrance - Cementitious Floor Base below Ceramic Floor Tiles	Brown/Gray Non-Fibrous Homogeneous		15% Quartz 50% Ca Carbonate 35% Non-fibrous (Other)	None Detected
15-47 061923748-0047	Original Building - Boys Restroom at Main Entrance - Grout to Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
15-48 061923748-0048	Original Building - Boys Restroom at Main Entrance - Grout to Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		45% Quartz 30% Ca Carbonate 25% Non-fibrous (Other)	None Detected
15-49 061923748-0049	Original Building - Boys Restroom at Main Entrance - Grout to Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
17-53 061923748-0053	Original Building - Boys Restroom at Room 20 - Grout to Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		60% Quartz 25% Ca Carbonate 15% Non-fibrous (Other)	None Detected
17-54 061923748-0054	Original Building - Boys Restroom at Room 20 - Grout to Ceramic Floor Tiles	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
17-55 061923748-0055	Original Building - Boys Restroom at Room 20 - Grout to Ceramic Floor Tiles	White Non-Fibrous Homogeneous	2% Cellulose 2% Synthetic	60% Ca Carbonate 36% Non-fibrous (Other)	None Detected
22-68 061923748-0068	Original Building - Hallway at Main Entrance - Interior Brick Mortar	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
22-69 061923748-0069	Original Building - Hallway at Main Entrance - Interior Brick Mortar	Gray Non-Fibrous Homogeneous		55% Quartz 25% Ca Carbonate 20% Non-fibrous (Other)	None Detected

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
22-70 061923748-0070	Original Building - Hallway at Main Entrance - Interior Brick Mortar	Tan Non-Fibrous Homogeneous	2% Cellulose	50% Quartz 30% Ca Carbonate 18% Non-fibrous (Other)	None Detected
31-95 061923748-0095	Original Building - Gym - Mortar to Wall Cinderblock	Gray/Tan/White Non-Fibrous Heterogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
31-96 061923748-0096	Original Building - Gym - Mortar to Wall Cinderblock	Gray/Tan/White Non-Fibrous Heterogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
31-97 061923748-0097	Original Building - Gym - Mortar to Wall Cinderblock	Gray/Tan/White Non-Fibrous Heterogeneous		65% Ca Carbonate 35% Non-fibrous (Other)	None Detected
32-98 061923748-0098	Original Building - Cafeteria - Mortar to Wall Cinderblock	Gray/White Non-Fibrous Heterogeneous		45% Quartz 30% Ca Carbonate 25% Non-fibrous (Other)	None Detected
32-99 061923748-0099	Original Building - Cafeteria - Mortar to Wall Cinderblock	Gray/White Non-Fibrous Heterogeneous		40% Quartz 30% Ca Carbonate 30% Non-fibrous (Other)	None Detected
32-100 061923748-0100	Original Building - Cafeteria - Mortar to Wall Cinderblock	Gray Non-Fibrous Homogeneous		50% Quartz 15% Ca Carbonate 35% Non-fibrous (Other)	None Detected
Paint layer not analyzed.					
33-101 061923748-0101	Original Building - Hallway at Cafeteria - Mortar to Wall Cinderblock	Gray/White Non-Fibrous Heterogeneous		45% Quartz 25% Ca Carbonate 30% Non-fibrous (Other)	None Detected
33-102 061923748-0102	Original Building - Hallway at Cafeteria - Mortar to Wall Cinderblock	Gray/White Non-Fibrous Heterogeneous		50% Quartz 20% Ca Carbonate 30% Non-fibrous (Other)	None Detected

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
33-103 061923748-0103	Original Building - Hallway at Cafeteria - Mortar to Wall Cinderblock	Gray Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 25% Non-fibrous (Other)	None Detected
			Paint not analyzed.		
34-104 061923748-0104	Original Building - Hallway at Kitchen - TSI/ Elbow	Gray Non-Fibrous Homogeneous	3% MinWool	42% Ca Carbonate 55% Non-fibrous (Other)	None Detected
34-105 061923748-0105	Original Building - Hallway at Cafeteria - TSI/ Elbow	Gray Non-Fibrous Homogeneous	8% MinWool	37% Ca Carbonate 55% Non-fibrous (Other)	None Detected
34-106 061923748-0106	Original Building - Hallway at Main Entrance - TSI/ Elbow	Gray Non-Fibrous Homogeneous	8% MinWool	42% Ca Carbonate 50% Non-fibrous (Other)	None Detected
35-107 061923748-0107	Original Building - Basement - Mortar to Wall Cinderblock	Gray Non-Fibrous Homogeneous		60% Quartz 25% Ca Carbonate 15% Non-fibrous (Other)	None Detected
35-108 061923748-0108	Original Building - Basement - Mortar to Wall Cinderblock	Gray Non-Fibrous Homogeneous		55% Quartz 30% Ca Carbonate 15% Non-fibrous (Other)	None Detected
35-109 061923748-0109	Original Building - Basement - Mortar to Wall Cinderblock	Tan Non-Fibrous Homogeneous		50% Quartz 25% Ca Carbonate 5% Gypsum 20% Non-fibrous (Other)	None Detected
36-110 061923748-0110	Original Building - Basement - Concrete Wall	Gray/White Non-Fibrous Homogeneous		50% Quartz 30% Ca Carbonate 20% Non-fibrous (Other)	None Detected
36-111 061923748-0111	Original Building - Basement - Concrete Wall	Gray/White Non-Fibrous Homogeneous		55% Quartz 25% Ca Carbonate 20% Non-fibrous (Other)	None Detected

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project
#:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
36-112 061923748-0112	Original Building - Basement - Concrete Wall	Gray Non-Fibrous Homogeneous		45% Quartz 25% Ca Carbonate 5% Gypsum 25% Non-fibrous (Other)	None Detected
37-113 061923748-0113	Original Building - Exterior - Stone Cap - Brick Mortar to Stone Cap	Gray Non-Fibrous Homogeneous		35% Quartz 40% Ca Carbonate 25% Non-fibrous (Other)	None Detected
37-114 061923748-0114	Original Building - Exterior - Stone Cap - Brick Mortar to Stone Cap	Gray Non-Fibrous Homogeneous		40% Quartz 30% Ca Carbonate 30% Non-fibrous (Other)	None Detected
37-115 061923748-0115	Original Building - Exterior - Stone Cap - Brick Mortar to Stone Cap	Gray Non-Fibrous Homogeneous		45% Quartz 30% Ca Carbonate 25% Non-fibrous (Other)	None Detected
38-116 061923748-0116	Original Building - Exterior - Stone Cap - Stone Cap / Cementitious Material	Gray Non-Fibrous Homogeneous		55% Quartz 25% Ca Carbonate 20% Non-fibrous (Other)	None Detected
38-117 061923748-0117	Original Building - Exterior - Stone Cap - Stone Cap / Cementitious Material	Gray Non-Fibrous Homogeneous		50% Quartz 20% Ca Carbonate 30% Non-fibrous (Other)	None Detected
38-118 061923748-0118	Original Building - Exterior - Stone Cap - Stone Cap / Cementitious Material	Gray Non-Fibrous Homogeneous		45% Quartz 25% Ca Carbonate 30% Non-fibrous (Other)	None Detected
39-119 061923748-0119	Original Building - Exterior - Loading Dock (Metal Stair) - Mortar to Wall Cinderblock	Gray/Tan Non-Fibrous Heterogeneous		45% Quartz 25% Ca Carbonate 30% Non-fibrous (Other)	None Detected
39-120 061923748-0120	Original Building - Exterior - Loading Dock (Metal Stair) - Mortar to Wall Cinderblock	Gray/Tan Non-Fibrous Heterogeneous		50% Quartz 20% Ca Carbonate 30% Non-fibrous (Other)	None Detected

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project
#:19-44304

Test Report: Asbestos Analysis of Bulk Materials by PLM via the NY State ELAP 198.1 Method

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
39-121	Original Building -	Tan		50% Quartz	None Detected
061923748-0121	Exterior - Loading Dock	Non-Fibrous		25% Ca Carbonate	
	(Metal Stair) - Mortar to Wall Cinderblock	Homogeneous		25% Non-fibrous (Other)	

Analyst(s)

Erick Rosa (11)

Steve Juszczuk (44)

Daniel Clarke, Asbestos Laboratory Manager
or other approved signatory

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
5-17 061923748-0017	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
5-18 061923748-0018	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
5-19 061923748-0019	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
6-20 061923748-0020	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
6-21 061923748-0021	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
6-22 061923748-0022	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
7-23 061923748-0023	Original Building - Library - Cove Base (Dark Blue)	Blue Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
7-24 061923748-0024	Original Building - Library - Cove Base (Dark Blue)	Blue Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
7-25 061923748-0025	Original Building - Main Office - Cove Base (Dark Blue)	Blue Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
8-26 061923748-0026	Original Building - Library - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
8-27 061923748-0027	Original Building - Library - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected

*Polarized Light Microscopy (PLM) is not consistently reliable in detecting asbestos in floor coverings 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 test results contained within this report meet the requirements of NELAC unless otherwise noted. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. The above test report relates only to the items tested. EMSL bears no responsibility for sample collection activities or analytical method limitations. Samples received in good condition unless otherwise noted.

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
8-28 061923748-0028	Original Building - Main Office - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
9-29 061923748-0029	Original Building - Room 14 - Glue to Dark Blue Cove Base	Black Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
9-30 061923748-0030	Original Building - Room 14 - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
9-31 061923748-0031	Original Building - Room 14 - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
10-32 061923748-0032	Original Building - Room 14 - Cove Base (Black)	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
10-33 061923748-0033	Original Building - Room 14 - Glue to Black Cove Base	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
10-34 061923748-0034	Original Building - Room 14 - Glue to Black Cove Base	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
11-35 061923748-0035	Original Building - Library - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	98.5% Other	1.5 Min. Wool	Inconclusive: No Asbestos Detected
11-36 061923748-0036	Original Building - Library - Glue to Carpet	Yellow Non-Fibrous Homogeneous	98.9% Other	1.1 Min. Wool	Inconclusive: No Asbestos Detected
11-37 061923748-0037	Original Building - Library - Glue to Carpet	Yellow Non-Fibrous Homogeneous	98.1% Other	1.9 Min. Wool	Inconclusive: No Asbestos Detected
12-38 061923748-0038	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected

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Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 10/19/2019 17:08:34



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Received Date: 10/18/2019 2:50 PM

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project
 #:19-44304

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
12-39 061923748-0039	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
12-40 061923748-0040	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
13-41 061923748-0041	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
13-42 061923748-0042	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
13-43 061923748-0043	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
16-50 061923748-0050	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
16-51 061923748-0051	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
16-52 061923748-0052	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
18-56 061923748-0056	Original Building - Hallway at Main Entrance - Cove Base (Black)	Blue Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
18-57 061923748-0057	Original Building - Hallway at Main Entrance - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
18-58 061923748-0058	Original Building - Hallway at Main Entrance - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	<1 Fibrous Other	Inconclusive: No Asbestos Detected

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 #:19-44304

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
19-59 061923748-0059	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
19-60 061923748-0060	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
19-61 061923748-0061	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
20-62 061923748-0062	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	Blue Non-Fibrous Homogeneous	100% Other	<1 Fibrous Other	Inconclusive: No Asbestos Detected
20-63 061923748-0063	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	White Non-Fibrous Homogeneous	100% Other	<1 Fibrous Other	Inconclusive: No Asbestos Detected
20-64 061923748-0064	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	White Non-Fibrous Homogeneous	100% Other	<1 Fibrous Other	Inconclusive: No Asbestos Detected
21-65 061923748-0065	Original Building - Hallway at Main Entrance - Mastic to 12"x12" Floor Tiles	Black Non-Fibrous Homogeneous	98.6% Other	None	1.4% Chrysotile 1.4% Total
21-66 061923748-0066	Original Building - Hallway at Main Entrance - Mastic to 12"x12" Floor Tiles				Positive Stop (Not Analyzed)
21-67 061923748-0067	Original Building - Hallway at Main Entrance - Mastic to 12"x12" Floor Tiles				Positive Stop (Not Analyzed)
23-71 061923748-0071	Addition Building - Hallway at Room 9 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	87% Other	13 Min. Wool	Inconclusive: No Asbestos Detected
23-72 061923748-0072	Original Building - Room 18 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	90% Other	10 Min. Wool	Inconclusive: No Asbestos Detected

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 #:19-44304

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
23-73 061923748-0073	Original Building - Room 19 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	89% Other	11 Min. Wool	Inconclusive: No Asbestos Detected
24-74 061923748-0074	Original Building - Hallway at Room 22 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	88% Other	12 Min. Wool	Inconclusive: No Asbestos Detected
24-75 061923748-0075	Original Building - Room 24 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	87% Other	13 Min. Wool	Inconclusive: No Asbestos Detected
24-76 061923748-0076	Original Building - Room 26 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	86% Other	14 Min. Wool	Inconclusive: No Asbestos Detected
25-77 061923748-0077	Original Building - Hallway - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	88% Other	12 Min. Wool	Inconclusive: No Asbestos Detected
25-78 061923748-0078	Original Building - Hallway at Cafeteria - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	85% Other	15 Min. Wool	Inconclusive: No Asbestos Detected
25-79 061923748-0079	Original Building - Slop sink - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	88% Other	12 Min. Wool	Inconclusive: No Asbestos Detected
26-80 061923748-0080	Original Building - Storage / Locker Room - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	87% Other	13 Min. Wool	Inconclusive: No Asbestos Detected
26-81 061923748-0081	Original Building - Locker Room at Kitchen - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	86% Other	14 Min. Wool	Inconclusive: No Asbestos Detected
26-82 061923748-0082	Original Building - Storage Room at Kitchen - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	83% Other	17 Min. Wool	Inconclusive: No Asbestos Detected

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
27-83 061923748-0083	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	87% Other	13 Min. Wool	Inconclusive: No Asbestos Detected
27-84 061923748-0084	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	86% Other	14 Min. Wool	Inconclusive: No Asbestos Detected
27-85 061923748-0085	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	83% Other	17 Min. Wool	Inconclusive: No Asbestos Detected
28-86 061923748-0086	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	83% Other	17 Min. Wool	Inconclusive: No Asbestos Detected
28-87 061923748-0087	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	85% Other	15 Min. Wool	Inconclusive: No Asbestos Detected
28-88 061923748-0088	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	84% Other	16 Min. Wool	Inconclusive: No Asbestos Detected
29-89 061923748-0089	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	85% Other	15 Min. Wool	Inconclusive: No Asbestos Detected
29-90 061923748-0090	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray Non-Fibrous Homogeneous	89% Other	11 Min. Wool	Inconclusive: No Asbestos Detected
29-91 061923748-0091	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray Non-Fibrous Homogeneous	90.7% Other	9.3 Min. Wool	Inconclusive: No Asbestos Detected
30-92 061923748-0092	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	87% Other	13 Min. Wool	Inconclusive: No Asbestos Detected
30-93 061923748-0093	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	85% Other	15 Min. Wool	Inconclusive: No Asbestos Detected

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 #:19-44304

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
30-94 061923748-0094	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	94.9% Other	5.1 Min. Wool	Inconclusive: No Asbestos Detected
40-122 061923748-0122	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
40-123 061923748-0123	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	<1 Fibrous Other	Inconclusive: No Asbestos Detected
40-124 061923748-0124	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
41-125 061923748-0125	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
41-126 061923748-0126	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
41-127 061923748-0127	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
42-128 061923748-0128	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
42-129 061923748-0129	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
42-130 061923748-0130	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
43-131 061923748-0131	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types
43-132 061923748-0132	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
43-133 061923748-0133	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
44-134 061923748-0134	Original Building - Exterior - West Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
44-135 061923748-0135	Original Building - Exterior - West Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
44-136 061923748-0136	Original Building - Exterior - South Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
45-137 061923748-0137	Original Building - Exterior - West Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
45-138 061923748-0138	Original Building - Exterior - West Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected
45-139 061923748-0139	Original Building - Exterior - South Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	Inconclusive: No Asbestos Detected

Analyst(s)

Carly Ciano (47)
 Jimmy Encalada (34)

Daniel Clarke, Asbestos Laboratory Manager
 or other approved signatory

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Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
5-17 061923748-0017	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
5-18 061923748-0018	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
5-19 061923748-0019	Original Building - Kitchen - In-Floor Grease / Water Trap - Inside Liner	Brown Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
6-20 061923748-0020	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
6-21 061923748-0021	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
6-22 061923748-0022	Original Building - Kitchen - In-Floor Grease / Water Trap - Cover Gasket	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
7-23 061923748-0023	Original Building - Library - Cove Base (Dark Bue)	Blue Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
7-24 061923748-0024	Original Building - Library - Cove Base (Dark Bue)	Blue Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

Analytical Sensitivity <1% Asbestos. This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
7-25 061923748-0025	Original Building - Main Office - Cove Base (Dark Blue)	Blue Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
8-26 061923748-0026	Original Building - Library - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
8-27 061923748-0027	Original Building - Library - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
8-28 061923748-0028	Original Building - Main Office - Glue to Dark Blue Cove Base	Beige Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
9-29 061923748-0029	Original Building - Room 14 - Glue to Dark Blue Cove Base	Black Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
9-30 061923748-0030	Original Building - Room 14 - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
9-31 061923748-0031	Original Building - Room 14 - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
10-32 061923748-0032	Original Building - Room 14 - Cove Base (Black)	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
10-33 061923748-0033	Original Building - Room 14 - Glue to Black Cove Base	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Customer PO:

Project ID:

Attention: Ryan Eid

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Received Date: 10/18/2019 02:50 PM

Analysis Date: 10/19/2019

Collected Date: 10/16/2019

Project: Golden Hill Elementary School, 478 Round Hill Rd, Florida, NY, Florida Union Free School District, Project #:19-44304

Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
10-34 061923748-0034	Original Building - Room 14 - Glue to Black Cove Base	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
11-35 061923748-0035	Original Building - Library - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
11-36 061923748-0036	Original Building - Library - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
11-37 061923748-0037	Original Building - Library - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
12-38 061923748-0038	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
12-39 061923748-0039	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
12-40 061923748-0040	Original Building - Room 14 - Glue to Carpet	Green Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
13-41 061923748-0041	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
13-42 061923748-0042	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
13-43 061923748-0043	Original Building - Room 14 - Glue to Carpet	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
16-50 061923748-0050	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
16-51 061923748-0051	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
16-52 061923748-0052	Original Building - Boys Restroom at Room 20 - Mastic to Ceramic Floor Tiles	Tan Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
18-56 061923748-0056	Original Building - Hallway at Main Entrance - Cove Base (Black)	Blue Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
18-57 061923748-0057	Original Building - Hallway at Main Entrance - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
18-58 061923748-0058	Original Building - Hallway at Main Entrance - Cove Base (Black)	Black Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
19-59 061923748-0059	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
19-60 061923748-0060	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
19-61 061923748-0061	Original Building - Hallway at Main Entrance - Glue to Black Cove Base	Yellow Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
20-62 061923748-0062	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	Blue Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
20-63 061923748-0063	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
20-64 061923748-0064	Original Building - Hallway at Main Entrance - 12"x12" Floor Tiles (Blue)	White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
23-71 061923748-0071	Addition Building - Hallway at Room 9 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
23-72 061923748-0072	Original Building - Room 18 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
23-73 061923748-0073	Original Building - Room 19 - 2'x4' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
24-74 061923748-0074	Original Building - Hallway at Room 22 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
24-75 061923748-0075	Original Building - Room 24 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
24-76 061923748-0076	Original Building - Room 26 - 2'x2' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
25-77 061923748-0077	Original Building - Hallway - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
25-78 061923748-0078	Original Building - Hallway at Cafeteria - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
25-79 061923748-0079	Original Building - Slop sink - 2'x2' Pinhole-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
26-80 061923748-0080	Original Building - Storage / Locker Room - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
26-81 061923748-0081	Original Building - Locker Room at Kitchen - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
26-82 061923748-0082	Original Building - Storage Room at Kitchen - 2'x4' Splash-Fissure Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
27-83 061923748-0083	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
27-84 061923748-0084	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
27-85 061923748-0085	Original Building - Slop Sink at Room 18 - 2'x4' Deep Fissure Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
28-86 061923748-0086	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
28-87 061923748-0087	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
28-88 061923748-0088	Original Building - Boys Restroom - 2'x2' Rough Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
29-89 061923748-0089	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray/White Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
29-91 061923748-0090	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
29-91 061923748-0091	Original Building - Band Room - 2'x4' Pinhole Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
30-92 061923748-0092	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
30-93 061923748-0093	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
30-94 061923748-0094	Original Building - Kitchen - 2'x4' Smooth Ceiling Tile	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
40-122 061923748-0122	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
40-123 061923748-0123	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
40-124 061923748-0124	Original Building - Exterior - Loading Dock (Metal Stair) - Floor Paint (Gray)	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
41-125 061923748-0125	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report:Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
41-126 061923748-0126	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
41-127 061923748-0127	Original Building - Exterior - Loading Dock (Metal Stair) - Brick Wall Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
42-128 061923748-0128	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
42-129 061923748-0129	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
42-130 061923748-0130	Original Building - Exterior - Main Entrance - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
43-131 061923748-0131	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
43-132 061923748-0132	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
43-133 061923748-0133	Original Building - Exterior - Kitchen / Storage Door - Door Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

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Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

Sample ID	Description	Appearance	Matrix Material	% Non-Asbestos Fibers	% Asbestos Types	% Total Asbestos
44-134 061923748-0134	Original Building - Exterior - West Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
44-135 061923748-0135	Original Building - Exterior - West Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
44-136 061923748-0136	Original Building - Exterior - South Elevation - Window Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
45-137 061923748-0137	Original Building - Exterior - West Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
45-138 061923748-0138	Original Building - Exterior - West Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected
45-139 061923748-0139	Original Building - Exterior - South Elevation - Expansion Joint Caulking	Gray Non-Fibrous Homogeneous	100% Other	None	No Asbestos Detected	None Detected

Analyst(s)

Rosemary Ortega (21)

Soaiful Islam (60)

Daniel Clarke, Asbestos Laboratory Manager
or other approved signatory

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Project: Golden Hill Elementary School, 478 Round Hill Rd., Florida, NY, Florida Union Free School District, Project #19-44304

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 46-140 061923744-0001		Description	Addition Building - Room #4 - Drywall /Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/18/2019	Gray	2.00% Cellulose	58.00% Ca Carbonate 35.00% Gypsum 5.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 46-141 061923744-0002		Description	Addition Building - Room #18 - Drywall /Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/18/2019	Gray	4.00% Cellulose	36.00% Ca Carbonate 55.00% Gypsum 5.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 46-142 061923744-0003		Description	Addition Building - Hallway at Room #11 - Drywall / Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/19/2019	Gray	3.00% Cellulose 2.00% Glass	25.00% Ca Carbonate 60.00% Gypsum 10.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47-143 061923744-0004		Description	Addition Building - Room #1 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Tan/ White	7.00% Cellulose	68.00% Ca Carbonate 5.00% Mica 20.00% Non-fibrous (other)	None Detected
Includes joint tape.					
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 10/19/2019 13:23:44



EMSL Analytical, Inc.

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

EMSL Order: 061923744

Customer ID: JC BR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 47-144 061923744-0005		Description	Addition Building - Room #2 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Tan/ White	5.00% Cellulose	65.00% Ca Carbonate 5.00% Mica 25.00% Non-fibrous (other)	None Detected
Includes joint tape.					
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47-145 061923744-0006		Description	Addition Building - Room #5 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Tan/ White		82.00% Ca Carbonate 3.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47-146 061923744-0007		Description	Addition Building - Room #6 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Tan/ White		80.00% Ca Carbonate 5.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47-147 061923744-0008		Description	Addition Building - Room #11 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Tan/ White		87.00% Ca Carbonate 3.00% Mica 10.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47-148 061923744-0009		Description	Addition Building - Room #12 - Wall Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	Gray/ White		78.00% Ca Carbonate 7.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 10/19/2019 13:23:44



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<http://www.EMSL.com> / carleplacelab@emsl.com

EMSL Order: 061923744

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 47-149 061923744-0010		Description Homogeneity	Addition Building - Hallway at Room #11 - Wall Joint Compound Heterogeneous		
PLM NYS 198.1 Friable	10/18/2019	White		86.00% Ca Carbonate 4.00% Mica 10.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 48-150 061923744-0011		Description Homogeneity	Addition Building / Exterior - East Elevation - Window Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray		100.00% Other	None Detected
Sample ID 48-151 061923744-0012		Description Homogeneity	Addition Building / Exterior - East Elevation - Window Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray		100.00% Other	None Detected
Sample ID 48-152 061923744-0013		Description Homogeneity	Addition Building / Exterior - West Elevation - Window Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray		100.00% Other	None Detected
Sample ID 49-153 061923744-0014		Description Homogeneity	Addition Building / Exterior - East Elevation - Expansion Joint Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray		100.00% Other	None Detected
Sample ID 49-154 061923744-0015		Description Homogeneity	Addition Building / Exterior - East Elevation - Expansion Joint Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray	None	100.00% Other	<1% Chrysotile

Initial report from: 10/19/2019 13:23:44



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EMSL Order: 061923744

Customer ID: JC BR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 49-155 061923744-0016		Description Homogeneity	Addition Building / Exterior - East Elevation - Expansion Joint Caulking Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/19/2019	Gray		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/19/2019	Gray		100.00% Other	None Detected

Initial report from: 10/19/2019 13:23:44



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EMSL Order: 061923744

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date: 10/18/2019

Sample Receipt Time: 2:50 PM

Analysis Completed Date: 10/18/2019

Analysis Completed Time: 9:02 PM

Analyst(s):

Carly Ciano PLM NYS 198.1 Friable (1)

Carly Ciano PLM NYS 198.6 NOB (6)

Steve Juszczuk PLM NYS 198.1 Friable (9)

Soaiful Islam TEM NYS 198.4 NOB (6)

Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

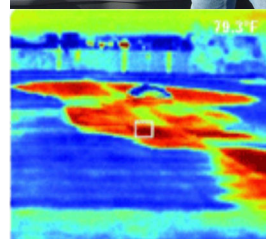
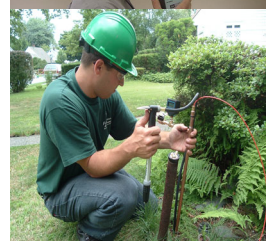
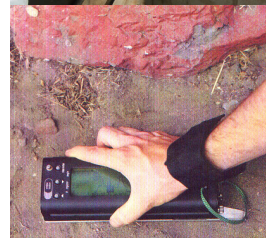
-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 10/19/2019 13:23:44

Laboratory Certifications



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

1775 Expressway Drive North

Hauppauge, New York 11788

631.584.5492 fax 631.584.3395

**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**



**Expires 12:01 AM April 01, 2020
Issued April 01, 2019**

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE
Issued in accordance with and pursuant to section 502 Public Health Law of New York State

**MR. DANIEL CLARKE
EMSL ANALYTICAL, INC.
528 MINEOLA AVE.
CARLE PLACE, NY 11514**

NY Lab Id No: 11469

***Is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:***

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

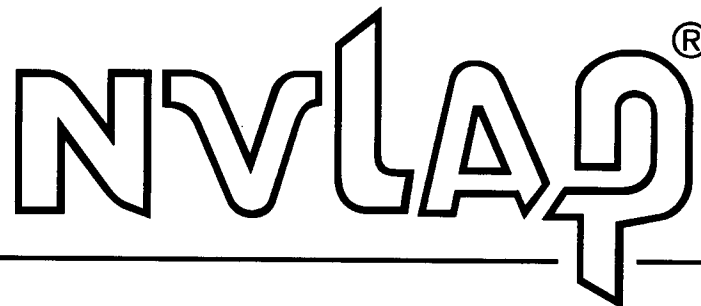
Sample Preparation Methods

EPA 3051A

Serial No.: 59670

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101048-10

EMSL Analytical, Inc.
Carle Place, NY

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

Asbestos Fiber Analysis

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

2019-07-01 through 2020-06-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EMSL Analytical, Inc.
528 Mineola Ave.
Carle Place, NY 11514
Daniel Clarke
Phone: 516-997-7251
Email: dclarke@emsl.com
<http://www.emsl.com>

ASBESTOS FIBER ANALYSIS

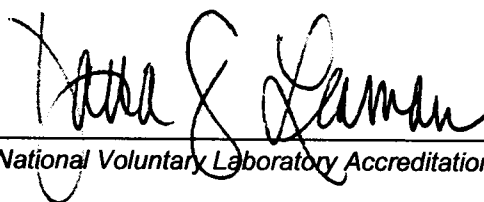
NVLAP LAB CODE 101048-10

Bulk Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

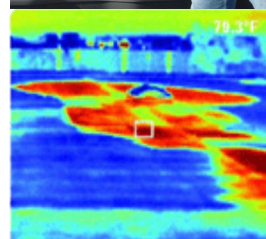
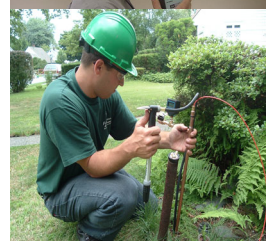
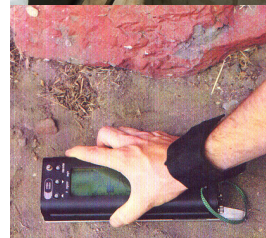
Airborne Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.



For the National Voluntary Laboratory Accreditation Program

JCB Certifications



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

1775 Expressway Drive North

Hauppauge, New York 11788

631.584.5492 fax 631.584.3395

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

J.C. Broderick & Associates Inc.

1775 Expressway Drive No.

Hauppauge, NY 11788

FILE NUMBER: 99-0503

LICENSE NUMBER: 28731

LICENSE CLASS: RESTRICTED

DATE OF ISSUE: 05/17/2019

EXPIRATION DATE: 05/31/2020

Duly Authorized Representative – Brendan Broderick:

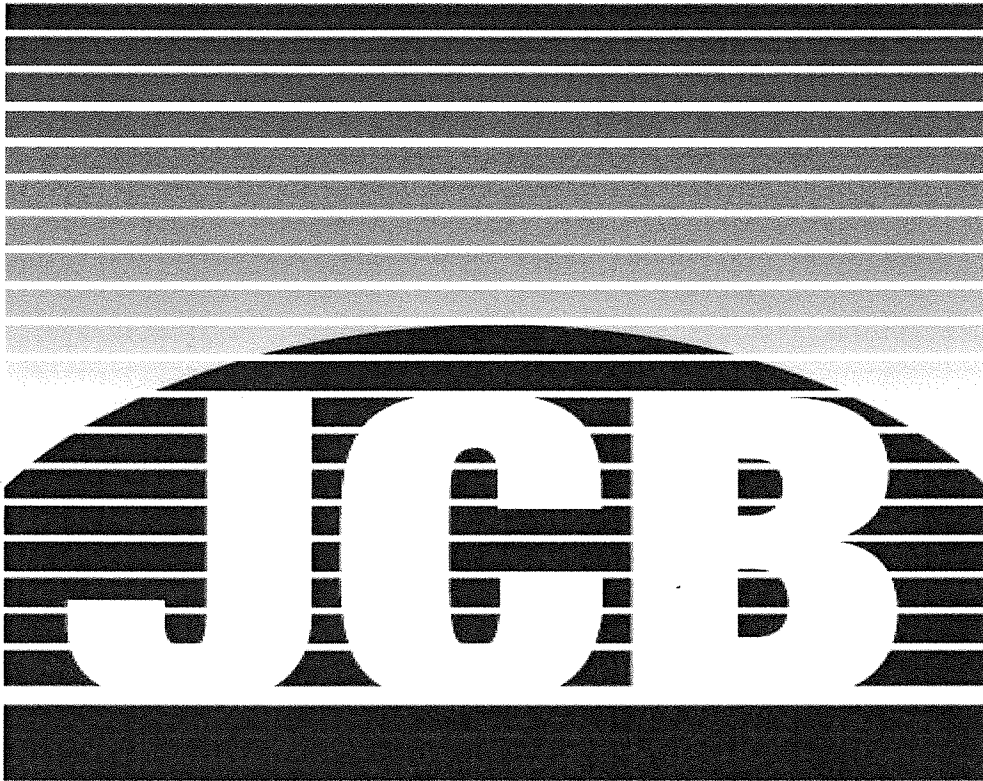
This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director
For the Commissioner of Labor

J.C. Broderick & Associates, Inc.



Ryan Eid

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



RYAN C EID
CLASS(EXPIRES)
C ATEC(10/20) D INSP(10/20)
E MGPL(10/19) H PM (10/20)
I PD (10/20)

CERT# 04-07665

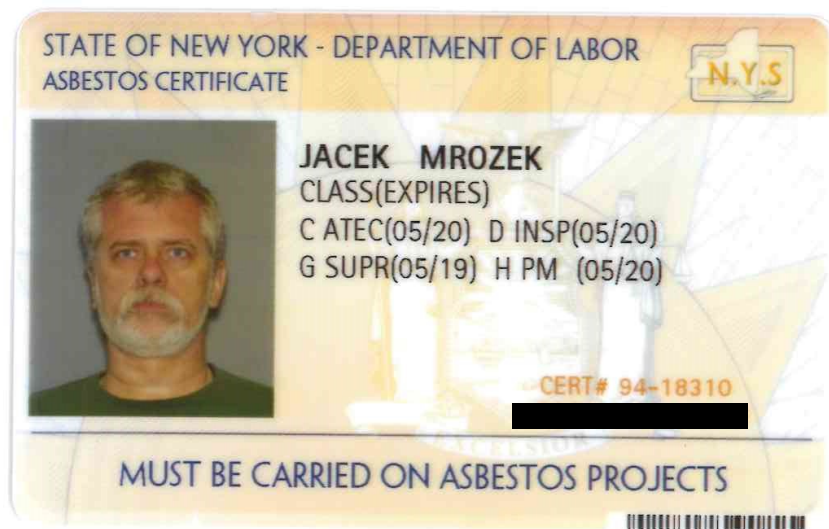
MUST BE CARRIED ON ASBESTOS PROJECTS



J.C. Broderick & Associates, Inc.



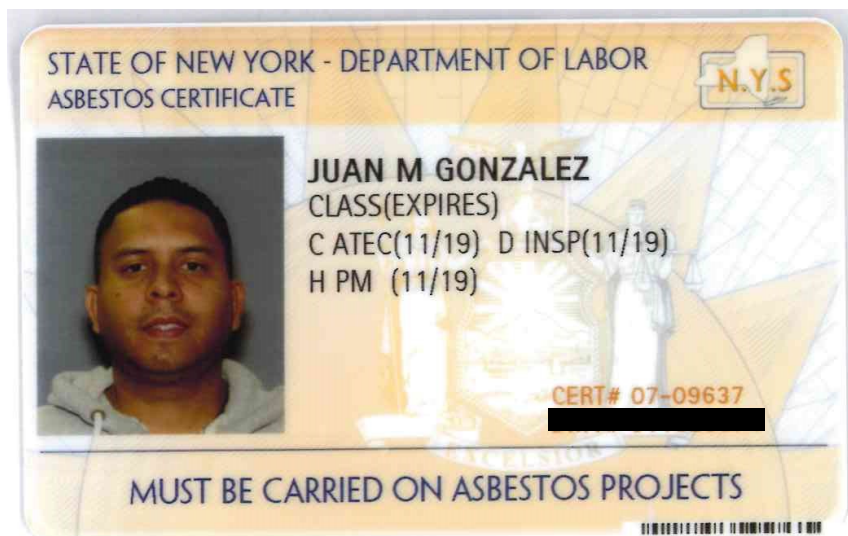
Jacek Mrozek



J.C. Broderick & Associates, Inc.



Juan M. Gonzalez



J.C. Broderick & Associates, Inc.

Environmental / Construction Consulting & Testing



1775 Expressway Drive North
Hauppauge, NY 11788

631.584.5492

Fax: 631.584.3395

www.jcbroderick.com

February 19, 2020

Mr. Thomas Andryshak
Florida Union Free School District
S.S. Seward Institute
51 N. Main Street
Florida, NY 10921

**Re: Pre-Construction Survey, Bulk Sampling & Analysis of
Suspect Asbestos Containing Materials
S.S. Seward Institute MS/HS
Sampling Date- October 21, 2019**

JCB#: 19-44304

Dear Mr. Andryshak:

J.C. Broderick & Associates, Inc. (JCB) performed bulk sampling and analysis of suspect asbestos containing materials (ACM) that may be disturbed by the following proposed scope of work. The proposed scope of work was identified by the architect of record and was understood by JCB to be limited to the following:

Scope of Work:

PHASE 1

- Repair Concrete Stairs At loading dock & near ramp & CMU Wall
- Replace Fire alarm panel and upgrade the system to current code
- Add carbon Monoxide Detection as per the new code
- Repair Crack at Kitchen. Repair misc, Gypsum board damage
- Allowance to replace damage/deteriorated interior doors (20). Replace corridor locksets with high security lockdown function type (60)
- Replace exterior doors/frames at gym & tech hall
- Power Wash Masonry at North wall, remove and replace MCJ, repair EIFS at cafeteria
- Original chimney not in use. Tuckpoint brick mortar joints & install stainless steel cap
- Replace corridor locksets with high security lockdown function type
- Allowance for brick mortar tuckpointing. Replace caulk at masonry control joints
- Small Grp. Instruction at Library Balcony
- New security vestibule

PHASE 2

- Repair & Rebalance the Negative Pressure issue in the Gym fan Room
- Mill and replace Asphalt Top Course (1.5") at entry drive, parking lot drop off & access drive (excludes new curbs), repair curb near dumpsters
- Replace 3 of 4 hot water storage tanks
- Replace carpet at main office, office & Tiered Music Classroom
- Replace 7 PTAC units
- Replace the library RTU
- Replace Computer lab 212 RTU

- Refurbish main office A/C Unit
- A/C at cafeteria
- Replace Ceiling at Café and Gym Lobby
- Add Sink in Art Room 105
- Replace 6th Grade Lockers (to single tier)
- Interior Renovations at Locker Rooms

Additional testing will be required if the scope of work changes or is different than reported above.

Inspection:

The inspection and subsequent bulk sampling were conducted by a New York State Department of Labor (NYS DOL) Licensed Consulting Firm by a certified asbestos inspector. The suspect materials identified were classified into homogenous material areas and then representative sampling of these materials was performed in accordance with the United States Environmental Protection Agency (US EPA) 40 CFR Part 763.86 (ASHERA). Copies of JCB's license and certification information are included in the attachment of this report.

Chain of custody forms were prepared for the samples collected. The samples were delivered to EMSL Analytical Laboratories, Inc. (EMSL) for analysis. EMSL is an independent environmental laboratory accredited by the New York State Department of Health, Environmental Laboratory Approval Program and the United States Department of Commerce, National Voluntary Laboratory Approval Program. Copies of EMSL's certifications are included in the attachment of this report. Technical information regarding the methods of analysis are available upon request.

NYS DOL Industrial Code Rule 56-2.1(p) (ICR 56) and US EPA 40 CFR Part 763.8 (ASHERA) define an asbestos containing material (ACM) as any material or product which contains more than one percent (1%) of asbestos. In accordance with this definition, the table below summarizes the results of the laboratory analysis reported by EMSL.

Table 1.0			
Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
<i>Confirmed ACBM Expected to be Impacted by the Proposed Scope of Work</i>			
A.	Joint Compound / Gypsum Board	Throughout Original Building	ASBESTOS (as per 2014 JCB Survey Report)
<i>Assumed ACBM Expected/Potential to be Impacted by Proposed Scope of Work</i>			
B.	Floor Tile / Mastic to Floor Tile	Throughout Building	Assumed Asbestos-Containing*
C.	Floor Fill / Self Leveling Materials	Throughout Building	Assumed Asbestos-Containing*
<i>Non-ACBM Expected/Potential to be Impacted by Proposed Scope of Work</i>			
D.	Wall Brick Mortar	Library Balcony	Not Asbestos
E.	Ceiling Plaster	Library Balcony	Not Asbestos
F.	Decorative Wall coffer/ Plaster	Library Balcony	Not Asbestos
G.	Glue to Carpet Floor	Library Balcony	Not Asbestos
H.	Cove Base	Library Balcony	Not Asbestos
I.	Glue to Cove Base	Library Balcony	Not Asbestos
J.	Glue to Carpet Mastic	Security Vestibule, Office, Music Room	Not Asbestos
K.	"12x12" Floor Tile	Security Vestibule	Not Asbestos
L.	Mastic to "12x12" Floor Tile	Security Vestibule	Not Asbestos

Table. 1.0 Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
M.	Vapor Barrier Below Hardwood Floor	Room 105	Not Asbestos
N.	Wall Brick Mortar	Girls/Boys Locker rooms	Not Asbestos
O.	Grout to Ceramic Wall tiles	Girls/Boys Locker rooms	Not Asbestos
P.	Glue to Ceramic Wall tiles	Girls/Boys Locker rooms	Not Asbestos
Q.	Grout to Ceramic Floor Tiles	Girls/ Boys Locker Rooms	Not Asbestos
R.	Glue to Ceramic Floor Tiles	Girls/ Boys Locker Rooms	Not Asbestos
S.	"12x12" Floor Tile	Girls/ Boys Locker Rooms	Not Asbestos
T.	Mastic to "12x12" Floor Tiles	Girls/ Boys Locker Rooms	Not Asbestos
U.	Vapor Barrier Below Hardwood Floor	Girls/ Boys Locker Rooms	Not Asbestos
V.	Cove Base	Girls/ Boys Locker Rooms	Not Asbestos
W.	Glue to Cove Base	Girls/ Boys Locker Rooms	Not Asbestos
X.	Wall Cinderblock Mortar	Boiler Room	Not Asbestos
Y.	Wall Cinderblock Mortar	Electrical Room	Not Asbestos
Z.	'1x1' Spline Ceiling Tile	Cafeteria Entrance/Gym Lobby	Not Asbestos
AA.	'2x2' Textured Pinhole Ceiling Tile	Basement	Not Asbestos
BB.	'2x4' Pinhole Ceiling Tile	Girls/ Boys Locker Rooms	Not Asbestos
CC.	'2x2' Pinhole Fissure Ceiling Tile	1 st /2 nd floor Bathrooms	Not Asbestos
DD.	Gypsum Board	Security Vestibule	Not Asbestos
EE.	Joint Compound	Security Vestibule	Not Asbestos
FF.	Gypsum Board	Throughout Addition Building	Not Asbestos
GG.	Joint Compound	Throughout Addition Building	Not Asbestos
HH.	Wall Cinderblock Mortar	Loading Dock	Not Asbestos
II.	Concrete Stair	Loading Dock	Not Asbestos
JJ.	Asphalt	Near Dumpster/parking Lot	Not Asbestos
KK.	Asphalt Tar (Patch)	Near Dumpster/parking Lot	Not Asbestos
LL.	Exterior Wall Brick Mortar	Original Building	Not Asbestos
MM.	Exterior Wall Brick Mortar	Addition Building	Not Asbestos
NN.	Wall Cinderblock Mortar	Addition Building	Not Asbestos
OO.	Expansion Joint Caulking (Dark Grey)	Exterior Elevation	Not Asbestos
PP.	Expansion Joint Caulking (Beige)	Exterior Elevation	Not Asbestos
QQ.	Roof Field Membrane - Vapor Barrier Paper	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
RR.	Roof Field Membrane - Upper Fiber Board	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
SS.	Roof Field Membrane - Lower Fiber Board	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
TT.	Roof Perimeter Flashing - Vapor Barrier Paper	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
UU.	Roof Perimeter Flashing - Upper Fiber Board	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
VV.	Roof Perimeter Flashing - Lower Fiber Board	Main Roof	Not Asbestos (as per 2014 JCB Survey Report)
Non-Suspect Materials to be Impacted by Proposed Scope of Work			
WW.	Electrical Wire Insulation Associated with Fire Alarm System	Throughout Building	Non-Suspect Material (All wire insulation is confirmed plastic)

Table. 1.0 Suspect Asbestos Containing Building Materials			
ID#	Material Description	Scope of Work Location	Asbestos
<p>*Materials ASSUMED to be asbestos. It should be confirmed if these materials will be impacted by the proposed work.</p> <p>¹ If demolition of bathroom wet-wall is planned, contractor shall consider high potential for damage to assumed ACM and ACM debris due to proximity to the wall being demolished</p> <p>NOTE: Potential of damaged asbestos pipe insulation within ceiling plenum and potential debris on top of ceiling tile. Caution should be exercised within these areas to not disturb asbestos pipe insulation or any debris. If necessary, any disturbance of suspect asbestos containing material must be conducted by a licensed abatement contractor.</p>			

Limitations of Inspection:

Although JCB took great care to identify and sample all suspect asbestos containing materials that may be impacted by the proposed scope of work, areas (spaces) and or suspect building materials may not have been accessible for inspection and/or sampling without causing significant damage to the existing building materials or due to physical access. Such areas and or materials that may not have inspected and or sampled due to these circumstances include, but are not limited to, the following

- Non-fiberglass pipe and pipe fitting insulation in plenum spaces such as ceilings, walls, chases, crawl spaces, etc.
- Suspect Debris within plenum spaces such as ceilings, walls, chases, crawl spaces, etc.
- Plenums above plaster ceilings and behind plaster walls.
- Plenums above spline ceiling tile systems.
- Waterproofing membrane in building cavities and below flooring systems (i.e. slabs, ceramic tile, wood, etc.).
- Mastic behind chalkboards/tack boards/mirrors.
- Electrical wire insulation servicing various equipment (ex. lighting fixtures).
- Flooring materials below existing casework.
- Asbestos heat shield insulation between lighting fixture and ceiling.
- Inaccessible, unknown materials (friable and non-friable) below flooring and roof systems.
- Gasket material associated with mechanical systems and duct work.
- Any suspect debris or presumed contaminated sand (such as within plenums and crawlspaces) is not homogenous and not considered a building material in accordance with ICR 56, therefore it cannot be quantitatively tested for asbestos content.

It is recommended that these materials should be presumed to be present or if possible, access be provided to JCB to inspect these spaces/materials.

Conclusions & Recommendations:

The intent of this asbestos containing materials survey was to sample and analyze only the suspect ACM that will be impacted by the proposed scope of work. This survey was not intended to identify all ACMs associated with the subject building and or the referenced subject spaces. If any other suspect ACM are encountered during the performance of the work, that are not referenced in the attachment of this report, these materials must be assumed as being asbestos containing until sampling and analysis is performed and determined otherwise.

Therefore, the contractor shall be advised that during demolition if any suspicious or suspect asbestos material is encountered during demolition, work shall stop immediately and the

contractor shall notify the architect and the material shall be sampled by the school district's environmental consultant for asbestos.

No determination was made by JCB if the materials listed in the table are homogenous throughout the remaining portions of the building. That is, the findings of this inspection are limited to information specifically indicated in the table.

The intent of the table above was to report the building materials that are "asbestos-containing" in accordance with the US EPA and NYS DOL. This report was not intended for compliance with the United States Occupational Safety & Health Administration (OSHA) standards. The contractor is responsible for their own compliance to OSHA and shall refer directly to the laboratory reports. All confirmed asbestos containing materials that are not scheduled to be removed should be implemented into an asbestos management plan.

Any disturbance of any confirmed asbestos or assumed asbestos containing materials must be performed by a licensed contractor and certified handlers in accordance with New York State Industrial Code Rule 56 (NYS ICR 56) and 40 CFR Part 763 and all other applicable federal, state and local regulations. General contractors shall also have properly trained and/or certified workers to work in regulated areas. Regulated areas, include crawl spaces, plenums, fan rooms and boiler rooms and any other area where damaged ACM exists or areas where ACM is likely to be disturbed.

It is recommended the district architect consider including an additional allowance for asbestos abatement work. The allowance shall be used to cover the cost of asbestos abatement work resulting from unforeseen conditions discovered during demolition and beyond the scope of the contract documents.

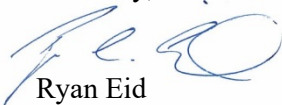
All contractors are responsible for the proper handling, staging and disposal of all hazardous and regulated wastes generated because of the work being performed.

The following project information has been included in the attachments section of this report.

1. Drawings & Photologs
2. Chain of Custody and Laboratory Analysis
3. Laboratory Certifications
4. JCB Certifications

If there are any questions or if more information is needed please feel free to call.

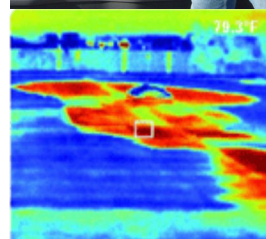
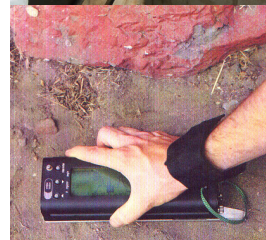
Sincerely,



Ryan Eid

J.C. BRODERICK & ASSOCIATES, INC.

Drawings & Photologs



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

1775 Expressway Drive North

Hauppauge, New York 11788

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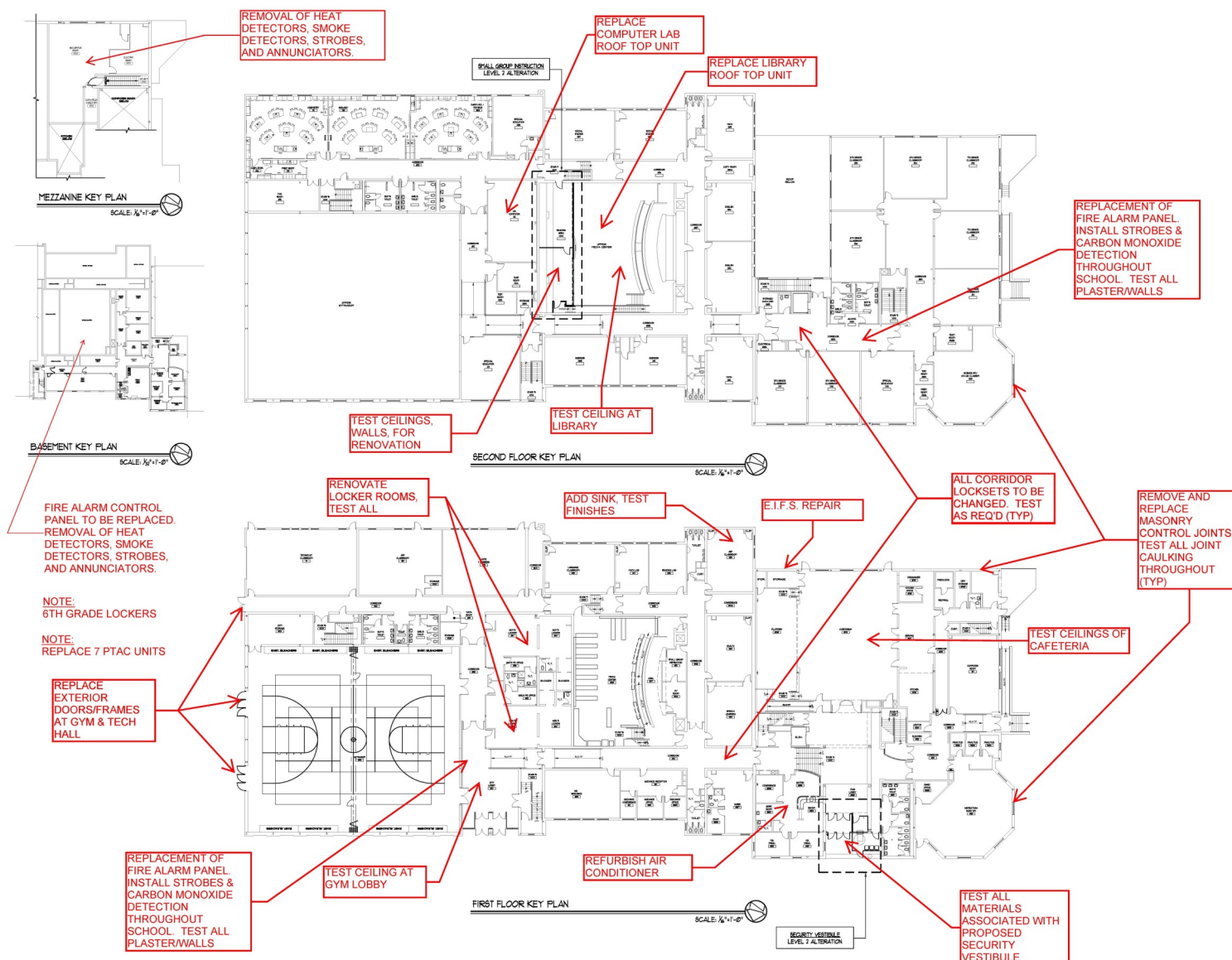
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Scope of Work Locations





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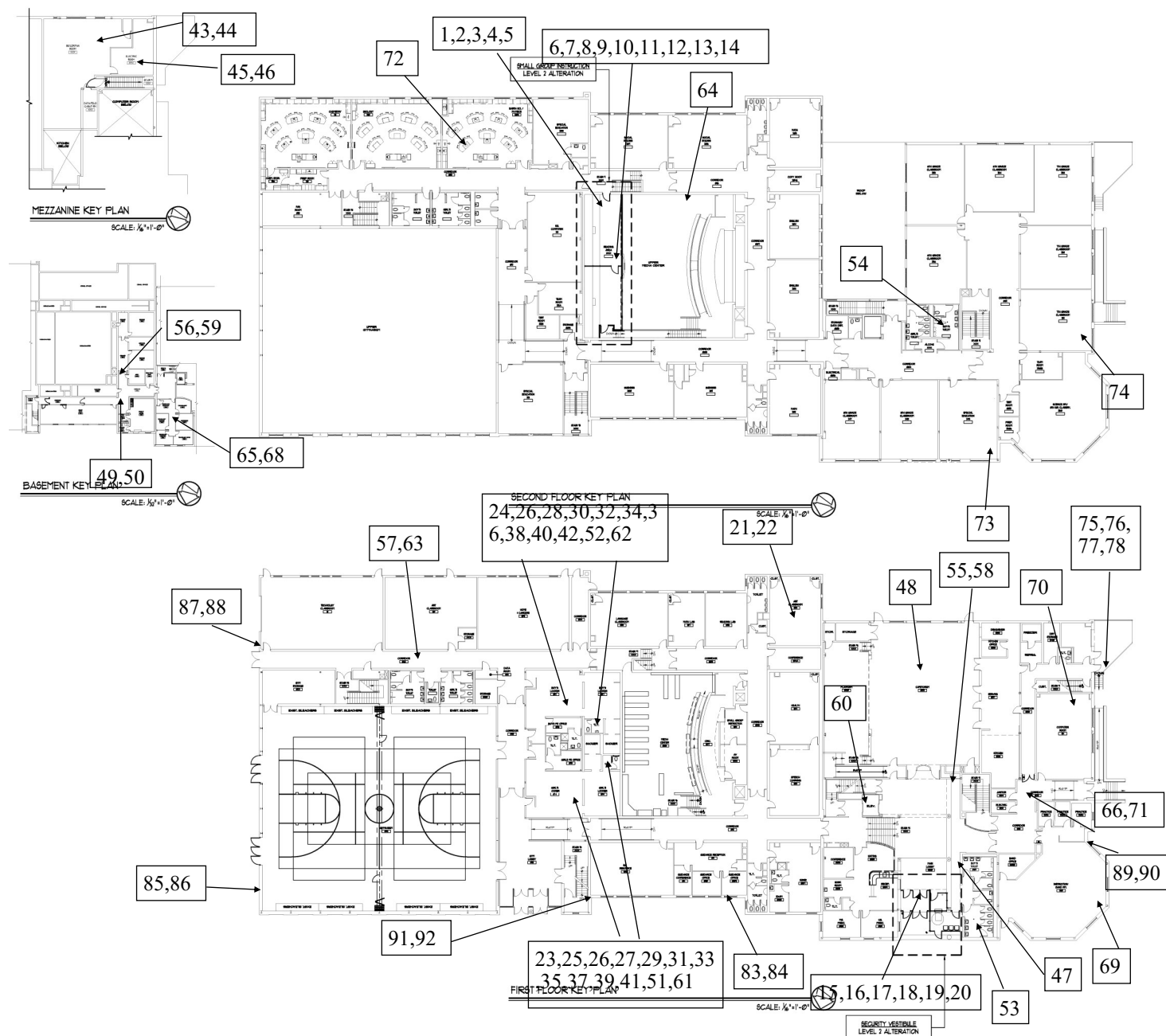
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**Sample
Locations**





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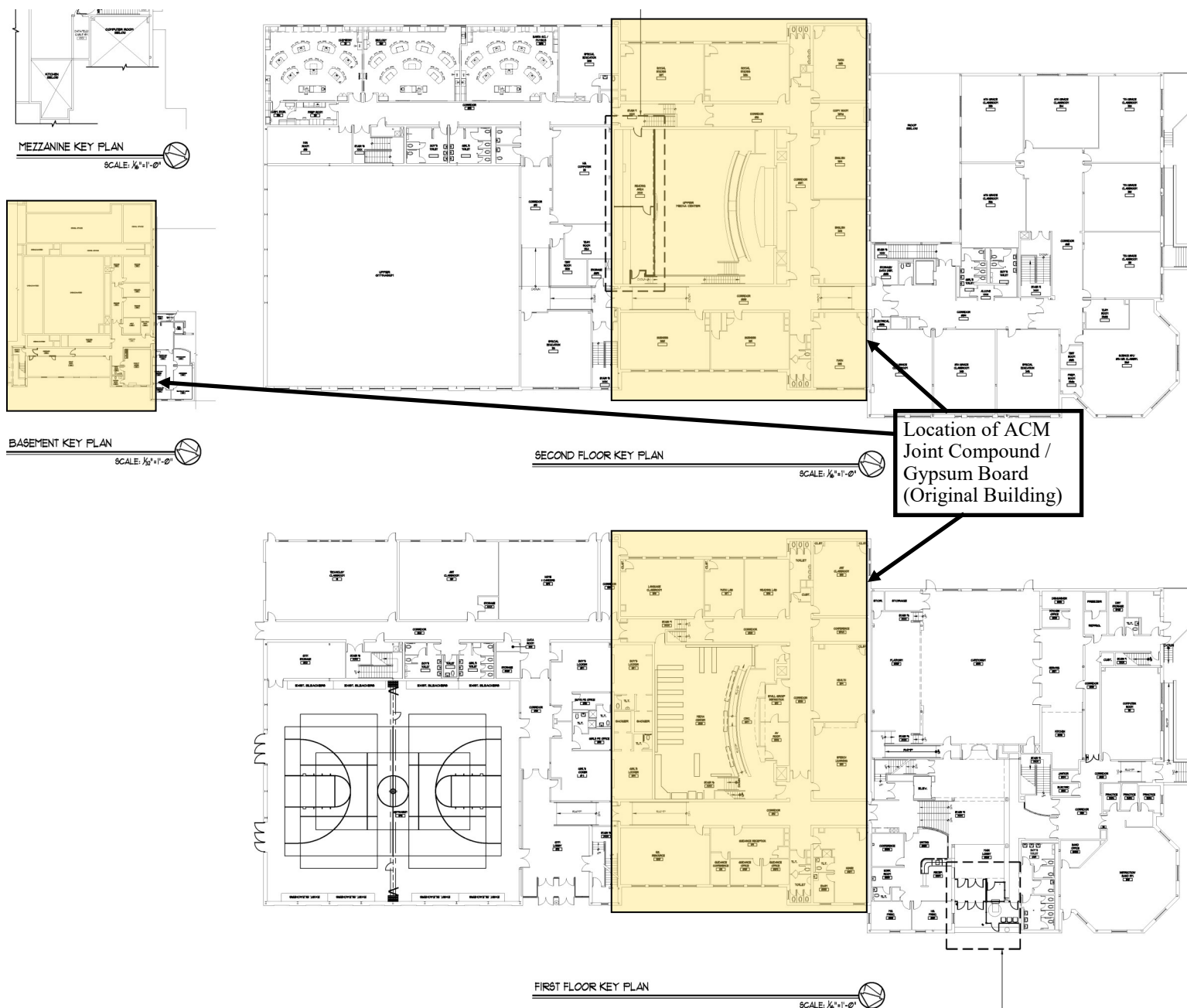
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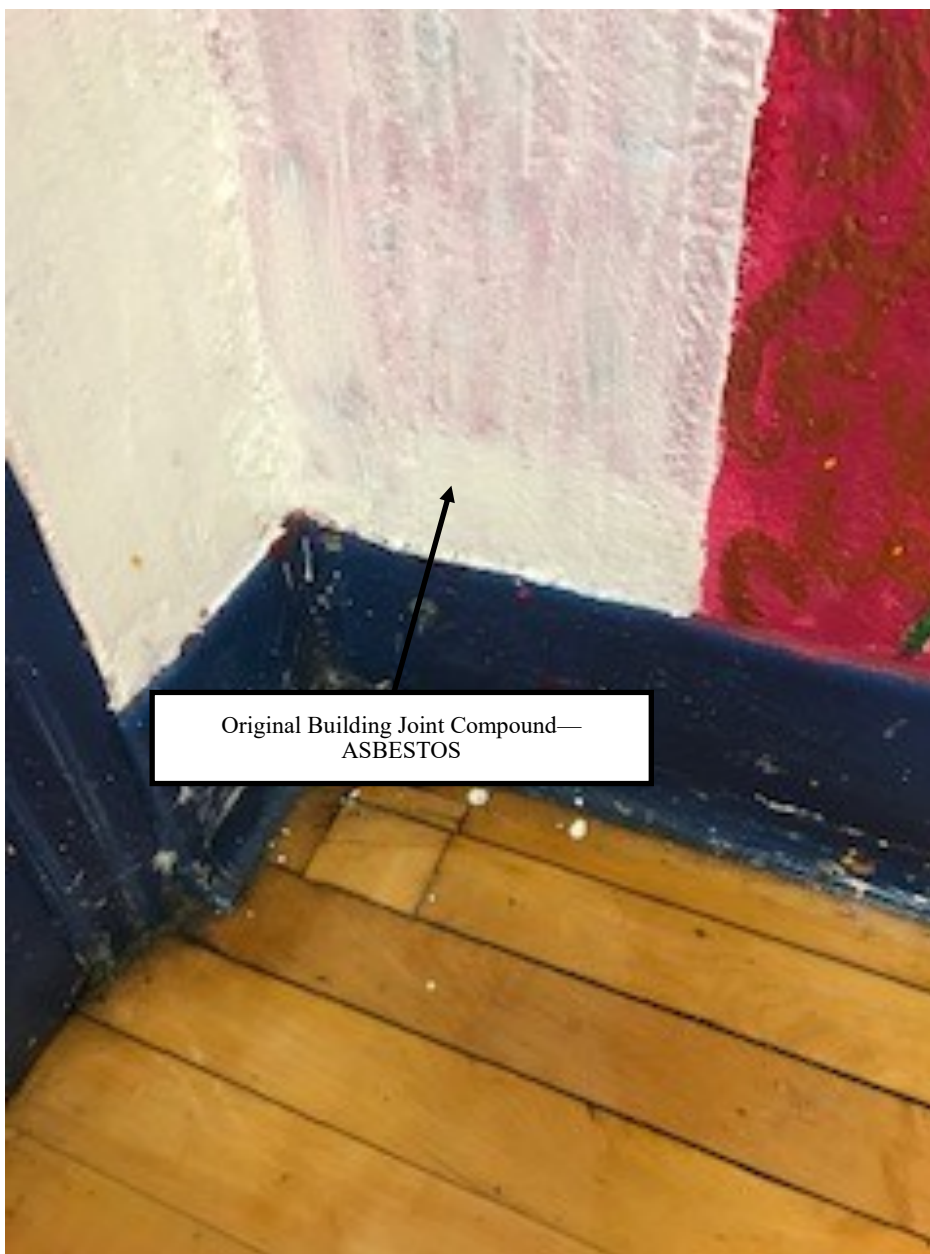
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**Location of
Asbestos
Containing
Materials**





Original Building Joint Compound—
ASBESTOS

JCB

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**Asbestos
Containing
Materials**



HM 2: Ceiling Plaster- Not Asbestos

HM 1: Wall Brick Mortar- Not Asbestos



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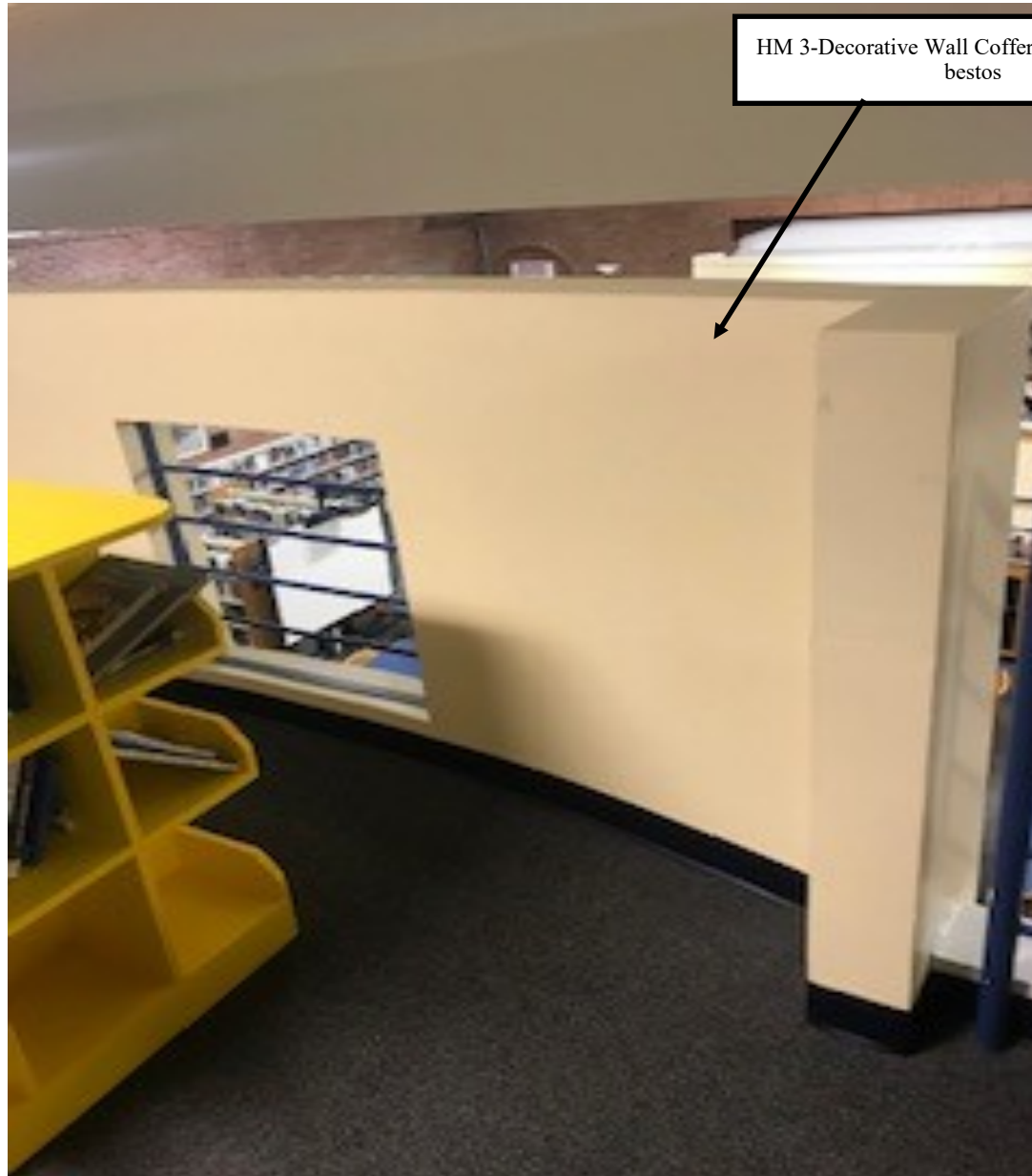
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Log**



HM 3-Decorative Wall Coffe/Plaster- Not Asbestos



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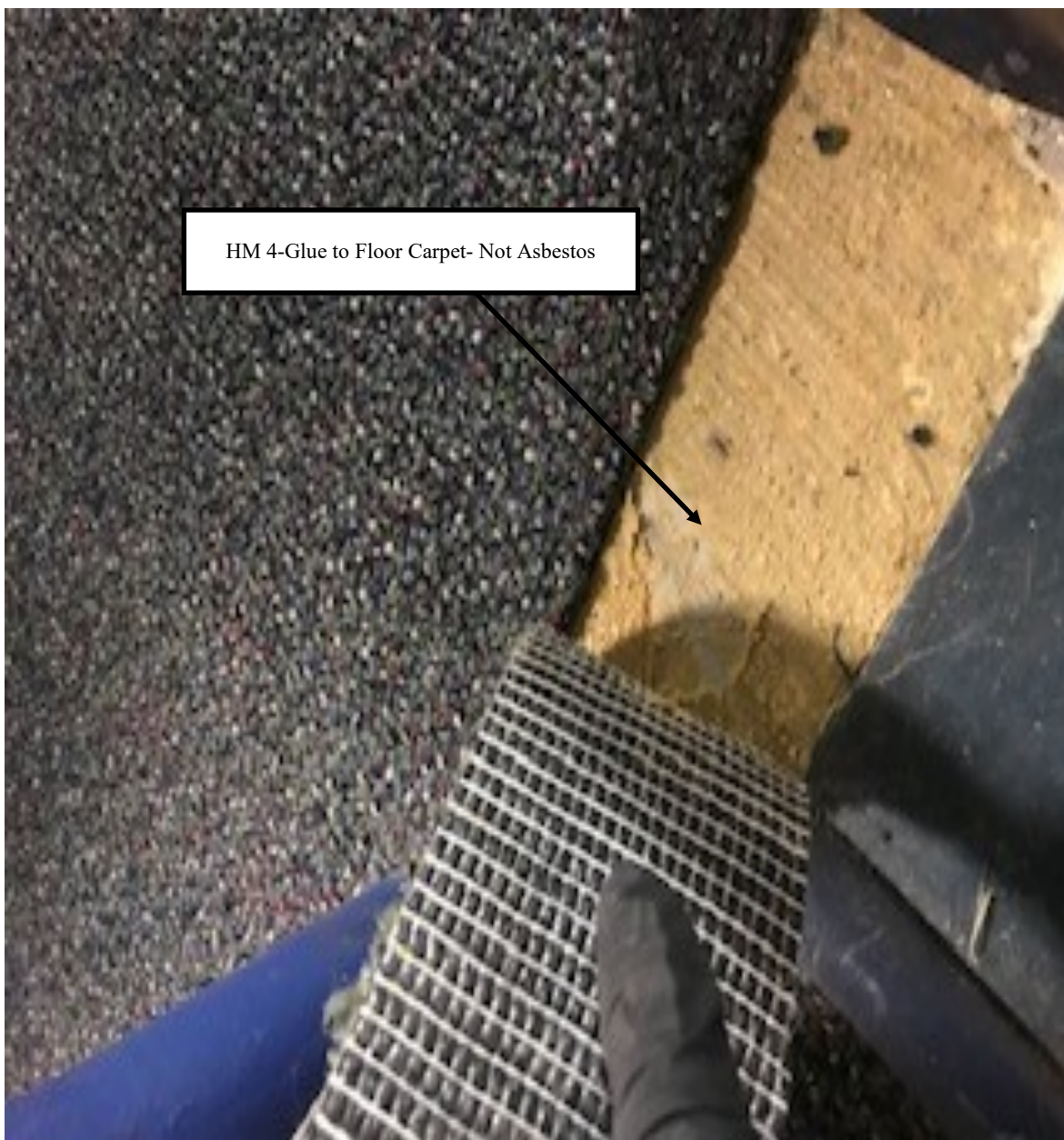
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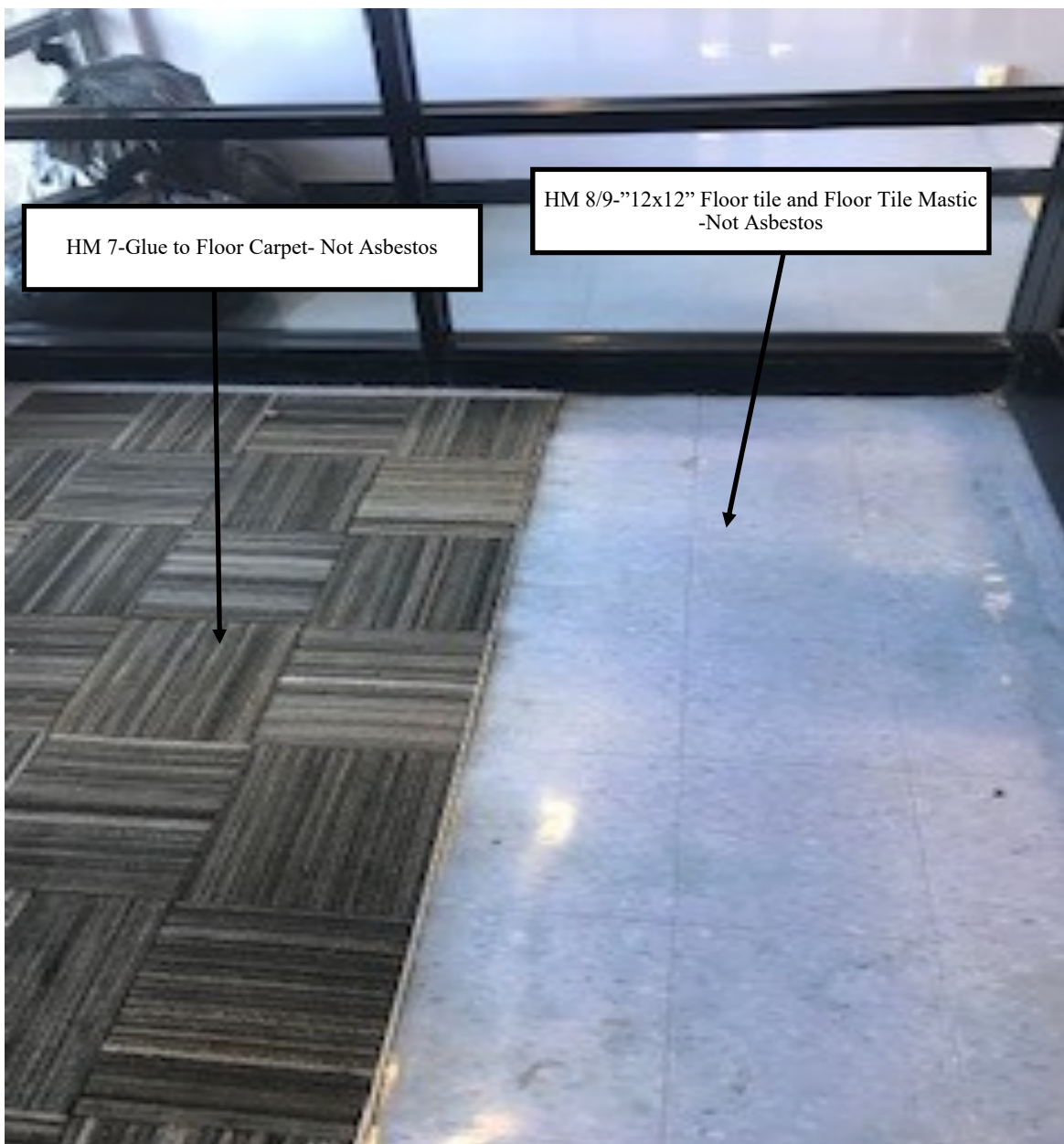
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**Photo
Log**



HM-10-Vapor Barrier Below Hardwood floor–
Not Asbestos



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Photo Log

Project No:

Building Name:

**Photo
Log**



HM-11-Wall Brick Mortar-Not Asbestos



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Log**



HM-12/13-Grout and Glue to Ceramic Wall Tiles
– Not Asbestos



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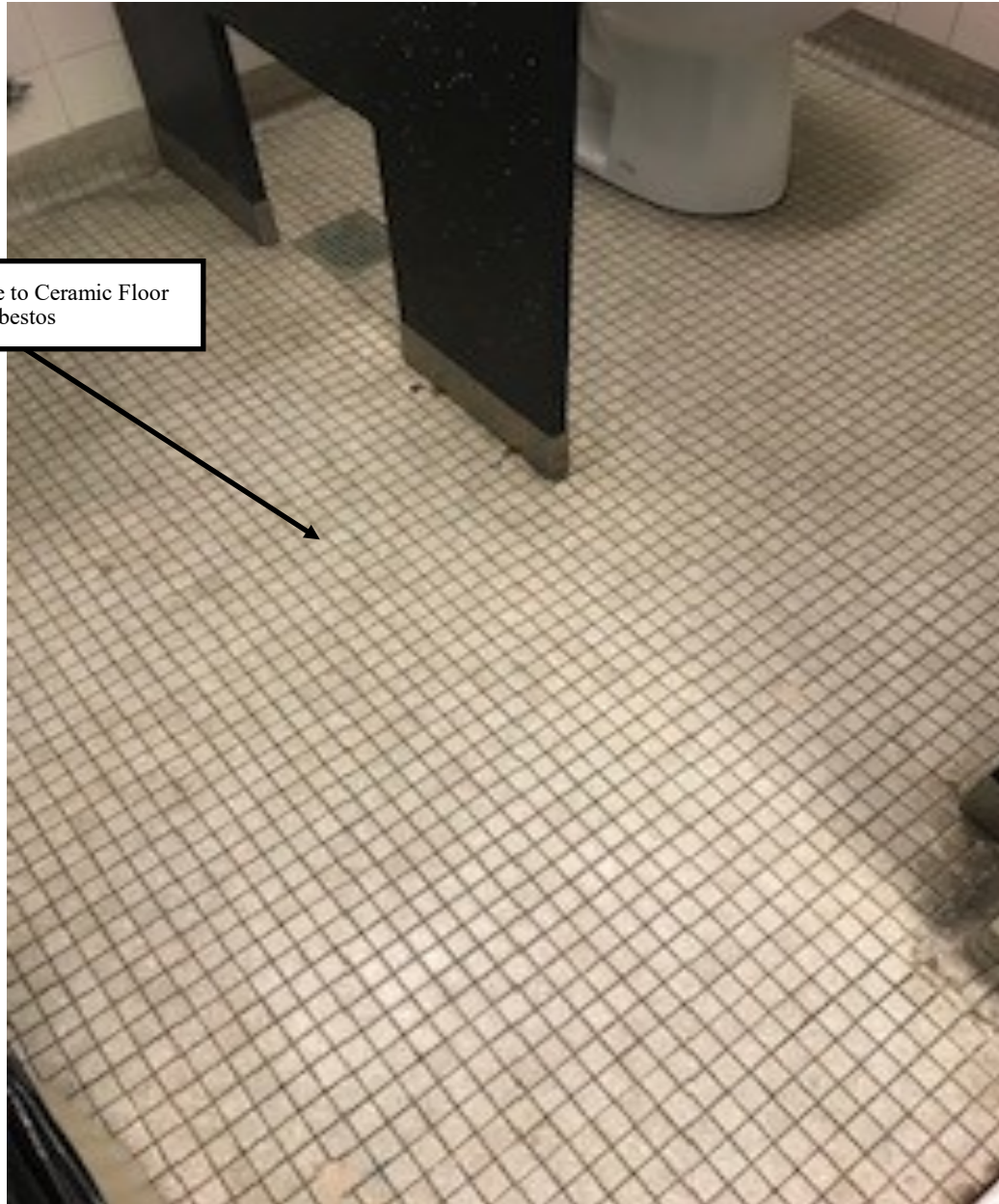
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**Photo
Log**

HM-14/15-Grout and Glue to Ceramic Floor
Tiles– Not Asbestos



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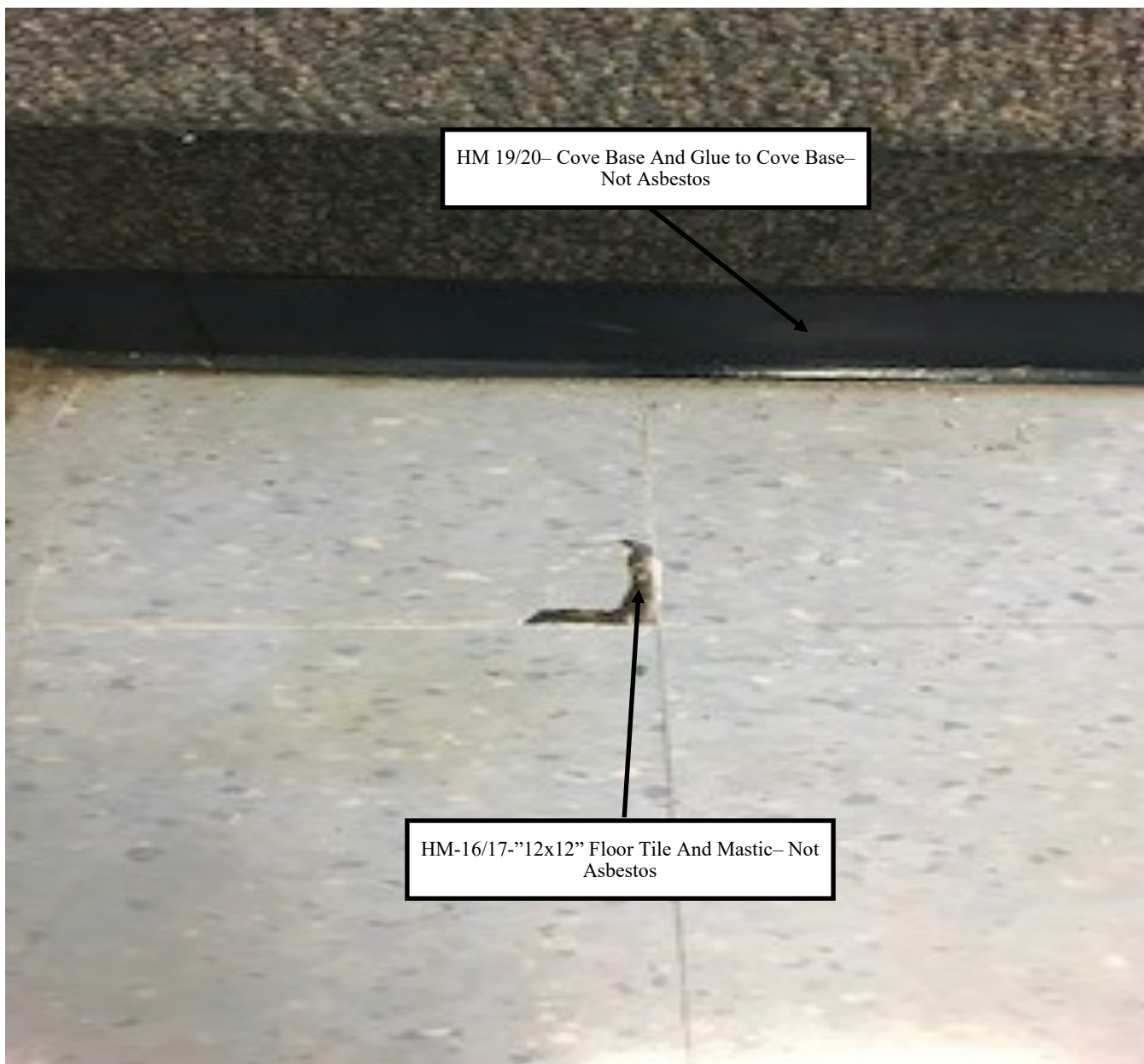
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**Photo
Log**



HM 19/20- Cove Base And Glue to Cove Base-
Not Asbestos

HM-16/17-12x12" Floor Tile And Mastic- Not
Asbestos



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HM 21- Cinder Block Mortar- Not Asbestos



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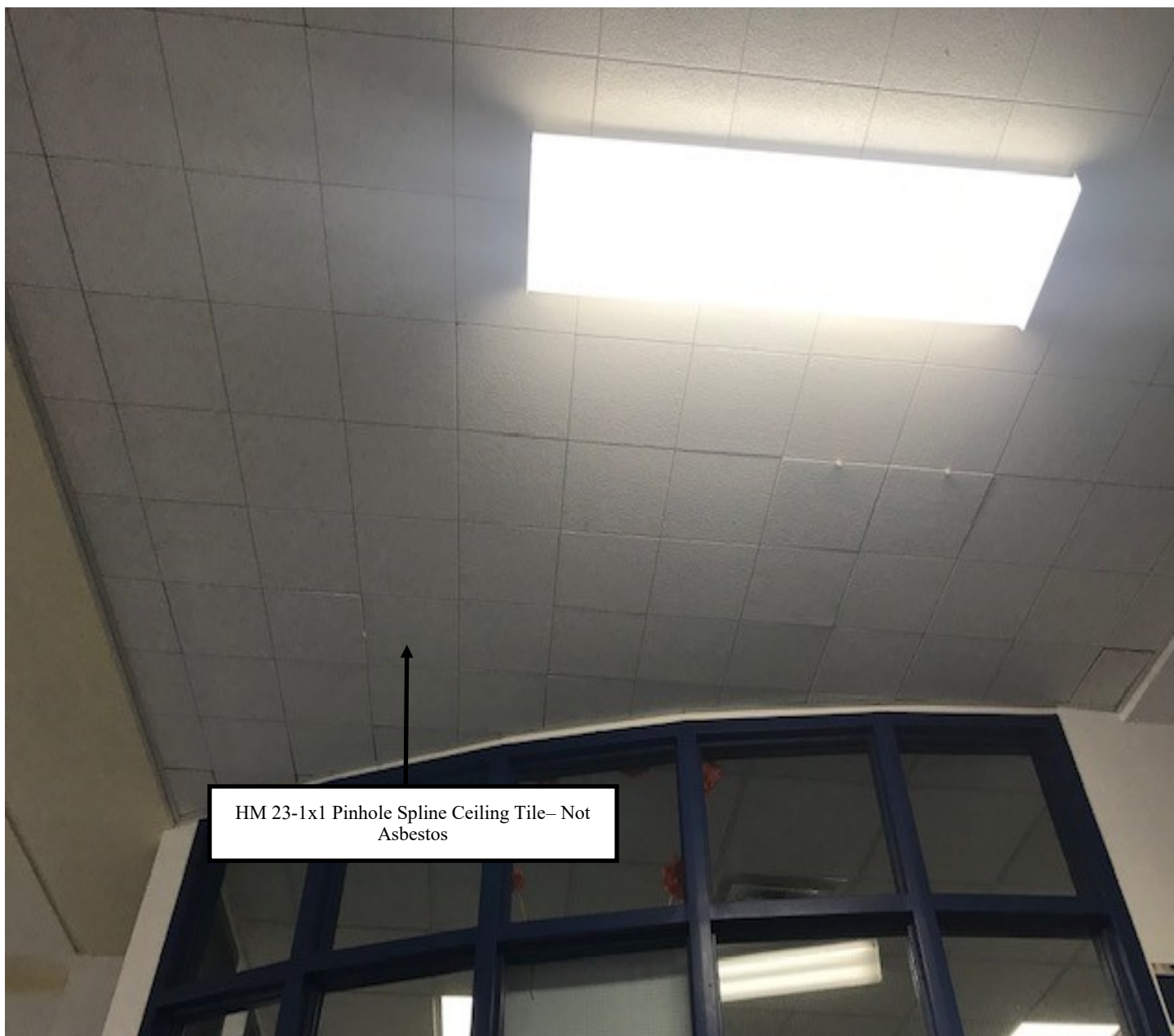
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HM 23-1x1 Pinhole Spline Ceiling Tile- Not
Asbestos



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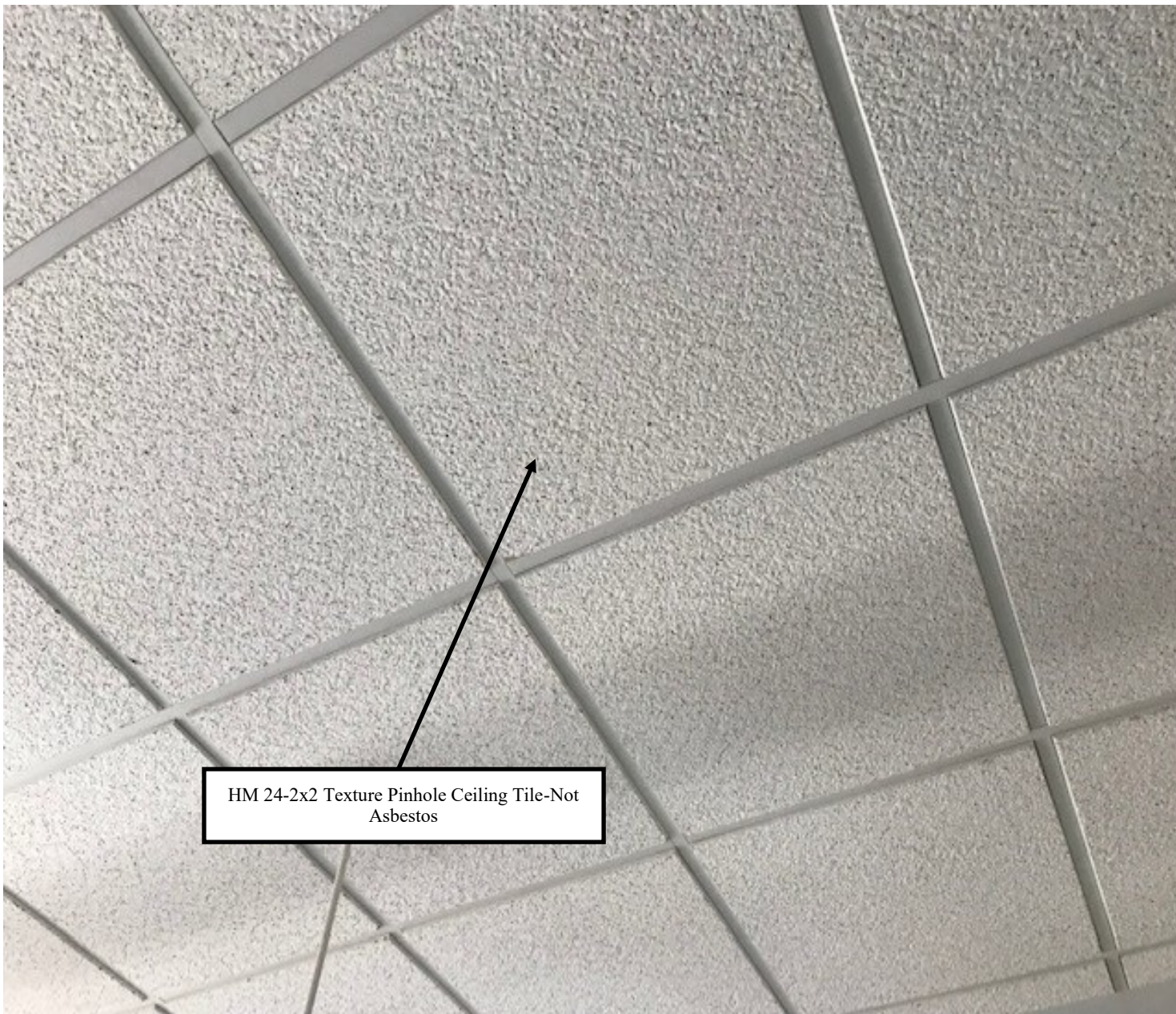
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HM 24-2x2 Texture Pinhole Ceiling Tile-Not
Asbestos



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HM 25- 2x4 Pinhole Ceiling Tile –Not Asbestos



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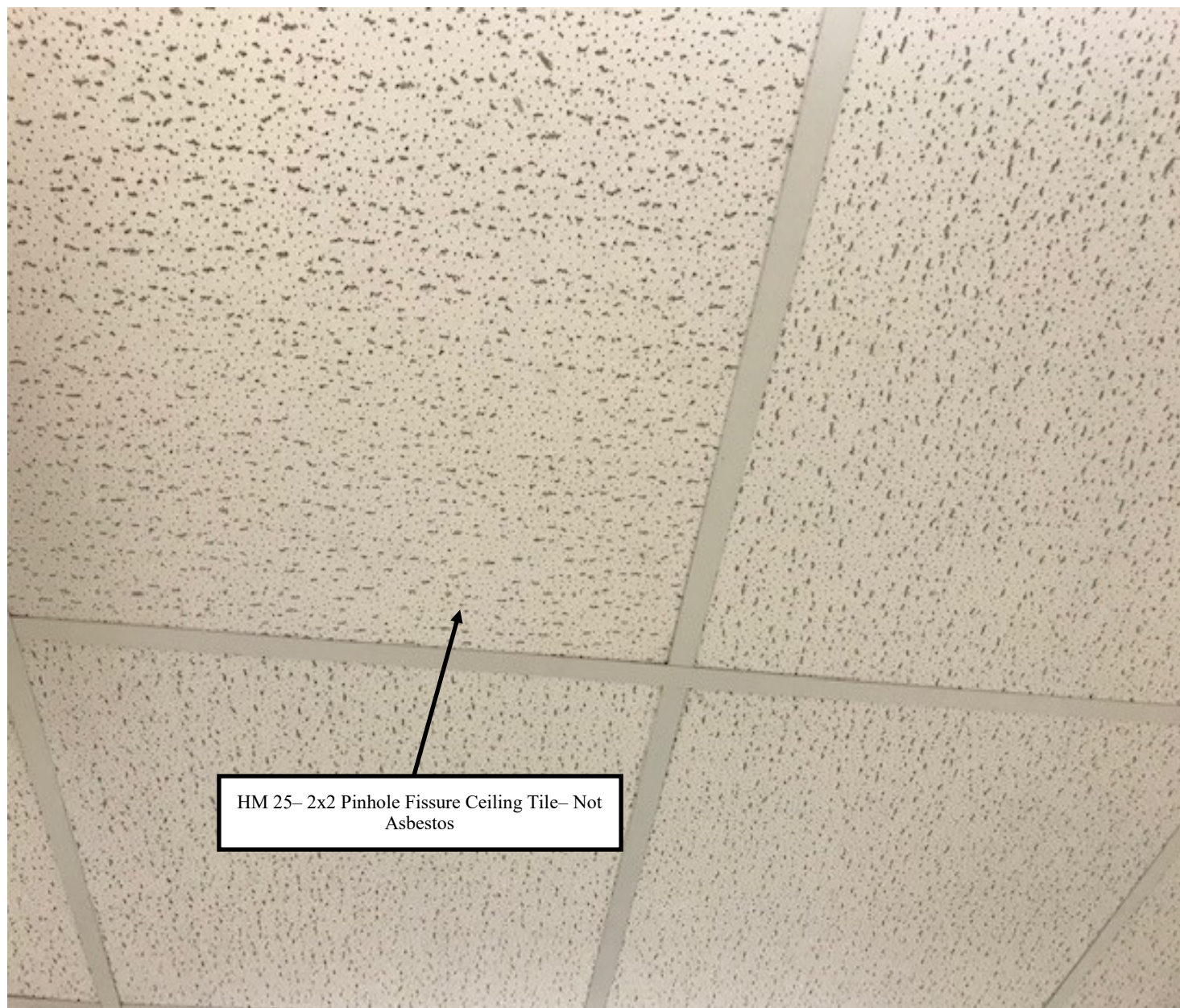
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Photo Log

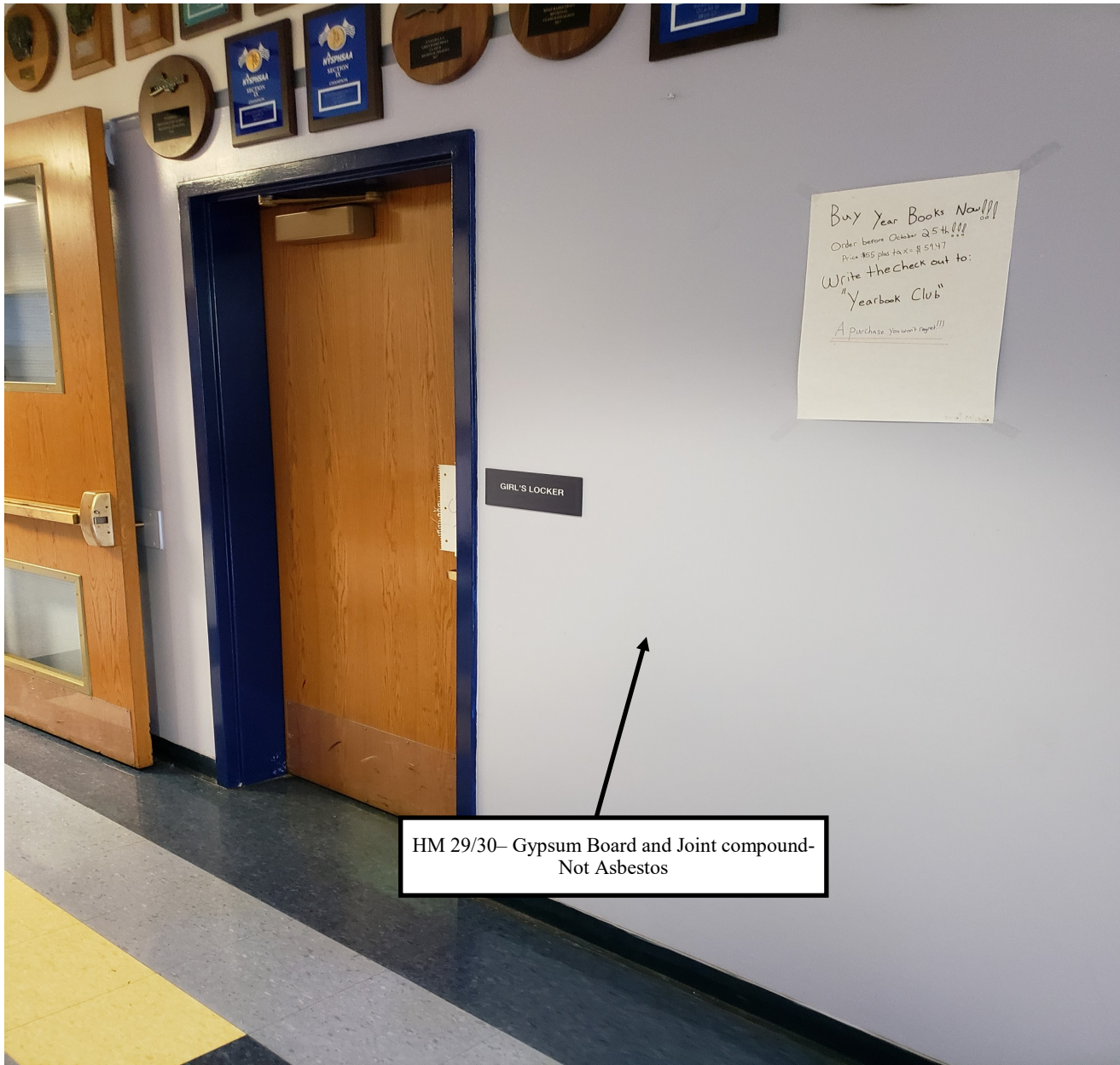
Project No:

Building Name:

**Photo
Log**



HM 25- 2x2 Pinhole Fissure Ceiling Tile- Not
Asbestos



HM 29/30- Gypsum Board and Joint compound-
Not Asbestos



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HM 31-Cinderblock Wall Mortar-Not Asbestos

HM 32- Concrete Stair Well- Not Asbestos

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HM 33- Floor Asphalt- Not Asbestos

HM 34- Floor Seam Tar(patch)- Not Asbestos

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HM 37- Cinderblock Wall Mortar- Not Asbestos



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HM 39- Expansion Joint Caulking (Beige)- Not
Asbestos



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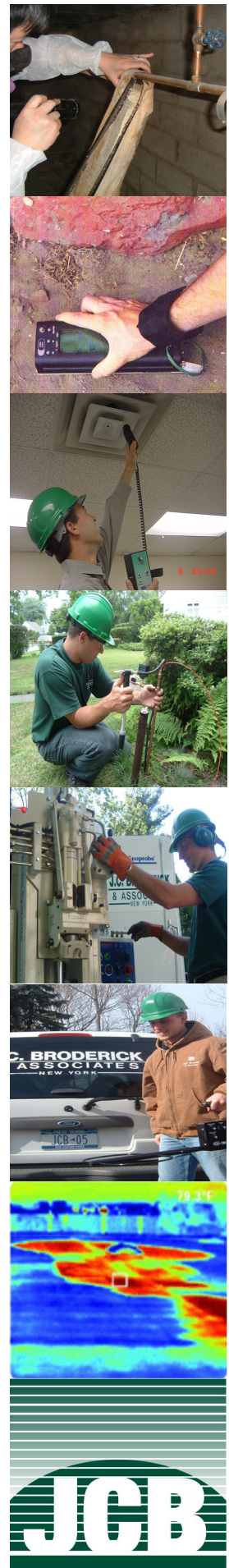
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Log**

Chain of Custody & Laboratory Analysis



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BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 1 OF 5


SITE: S.S. Seward Institute MS/HS
 ADDRESS: 51 N Main St, Florida, NY
 DATE: 10/21/19
 CLIENT: Florida Union Free School District
 PROJECT #: 19 - 44304

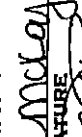
SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek
 SAMPLER'S SIGN: 
 LABORATORY: EMSL
 TURNAROUND TIME: 24 HOUR
 (CIRCLE ONE)

MANAGER: R. Eid

ANALYZE EACH MATERIAL TO 1ST POSITIVE

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
1	1	Wall Brick Mortar	Library Balcony	ACM (C)
	2	↓	↓	↓
2	3	Ceiling Plaster	↓	↓
	4	↓	↓	↓
	5	↓	↓	↓
3	6	Decorative Wall Coffer / Plaster	↓	↓
	7	↓	↓	↓
	8	↓	↓	↓
4	9	Glue to Floor Carpet	↓	↓
	10	↓	↓	↓
5	11	Cove Base	↓	↓
	12	↓	↓	↓
6	13	Glue to Cove Base	↓	↓
	14	↓	↓	↓
7	15	Glue to Floor Carpet	Security Vestibule	↓
	16	↓	↓	↓
8	17	12" X 12" Floor Tiles	↓	↓
	18	↓	↓	↓
9	19	Glue to 12" X 12" Floor Tiles	↓	↓
	20	↓	↓	↓
10	21	Vapor Barrier below Hardwood Floor	Room # 105	↓
	22	↓	↓	↓

SUBMITTED BY (PRINT) Jacek Mrozek
 SIGNATURE 
 DATE 10/22/19
 TIME 15:00

RECEIVED BY (PRINT) UNIQUE Mrozek
 ANALYST (PRINT) Jimmy Encalada
 SIGNATURE 
 DATE 10/23/19
 TIME 10:54 PM

COMMENTS: Please email results to: reid@jcbroderick.com

ANALYSIS METHOD: ANALYTICAL

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TEM -  10/23/19


James Montalbano 10/23/19

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BULK SAMPLING CHAIN OF CUSTODY RECORD



PAGE 2 OF 5

SITE: S.S. Seward Institute MS/HS
 ADDRESS: 51 N Main St, Florida, NY
 DATE: 10/21/19
 CLIENT: Florida Union Free School District
 PROJECT #: 19 - 44304
 MANAGER: R. Eid

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek
 SAMPLER'S SIGN: 
 LABORATORY: EMSL
 TURNAROUND TIME: (CIRCLE ONE) 24 HOUR 12 HOUR 6 HOUR 3 HOUR OTHER

ANALYZE EACH MATERIAL TO 1ST POSITIVE

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD
11	23	Wall Brick Mortar	Girls / Boys Locker Rooms	ACM
	24	↓	↓	↓
12	25	Grout to Ceramic Wall Tiles	↓	↓
	26	↓	↓	↓
13	27	Glue to Ceramic Wall Tiles	↓	↓
	28	↓	↓	↓
14	29	Grout to Ceramic Floor Tiles	↓	↓
	30	↓	↓	↓
15	31	Glue to Ceramic Floor Tiles	↓	↓
	32	↓	↓	↓
16	33	12" X 12" Floor Tiles	↓	↓
	34	↓	↓	↓
17	35	Glue to 12" X 12" Floor Tiles	↓	↓
	36	↓	↓	↓
18	37	Vapor Barrier below Hardwood Floor	↓	↓
	38	↓	↓	↓
19	39	Cove Base	↓	↓
	40	↓	↓	↓
20	41	Glue to Cove Base	↓	↓
	42	↓	↓	↓
21	43	Wall Cinderblock Mortar	Boiler Room	↓
	44	↓	↓	↓
22	45	↓	Electr. Room	↓
	46	↓	↓	↓

SUBMITTED BY (PRINT) Jacek Mrozek
 SIGNATURE 
 DATE 10/22/19
 TIME 15:10
 RECEIVED BY (PRINT) UNIQUE MROZEK
 ANALYST (PRINT) JIMMY ENCALADA
 SIGNATURE 
 DATE 10/22/19
 TIME 10:56pm

COMMENTS: Please email results to: reid@jcbroderick.com

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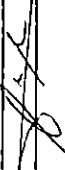
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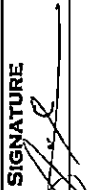

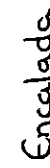
BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 3 OF 5

SITE: S.S. Seward Institute MS/HS
 ADDRESS: 51 N Main St, Florida, NY
 DATE: 10/21/19
 CLIENT: Florida Union Free School District
 PROJECT #: 19 - 44304
 ANALYZE EACH MATERIAL TO 1ST POSITIVE

SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek
 SAMPLER'S SIGN: 
 LABORATORY: EMSL
 TURNAROUND TIME: 24 HOUR
 (CIRCLE ONE)

MANAGER: R. Eid
 12 HOUR 6 HOUR RUSH OTHER

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD		
23	47	1' X 1' Pinhole Spline Ceiling Tile	Cafeteria (Entrance)	ACM		
	48	↓	Gym Lobby	↓		
24	49	2' X 2' Text. Pinhole Ceiling Tile	Basement	↓		
	50	↓	↓	↓		
25	51	2' X 4' Pinhole Ceiling Tile	Locker Rooms	↓		
	52	↓	↓	↓		
26	53	2' X 2' Pinhole Fissure Ceiling Tile	1 st Floor / Bathrooms	↓		
	54	↓	2 nd Floor / Bathrooms	↓		
27	55	Drywall / Sheetrock	Original Building at Lunch Room	↓		
	56	↓	Original Building / Basement Corridor	↓		
	57	↓	Original Building / 1 st Floor Corridor	↓		
28	58	Joint Compound	Original Building at Lunch Room	↓		
	59	↓	Original Building / Basement Corridor	↓		
	60	↓	Original Building / 1 st Floor by Elevator	↓		
	61	↓	Original Building / Girls Locker Room	↓		
	62	↓	Original Building / Boys Locker Room	↓		
	63	↓	Original Building / 1 st Floor Corridor	↓		
	64	↓	Original Building / Library	↓		
29	65	Drywall / Sheetrock	Addition Building / Basement Corridor	↓		
	66	↓	Addition Building / 1 st Floor Corridor	↓		
	67	↓	Addition Building / 2 nd Floor Corridor	↓		
				19 00		
				00 00		
SUBMITTED BY (PRINT)		SIGNATURE	RECEIVED BY (PRINT)	SIGNATURE	DATE	TIME
Jacek Mrozek			UNIQUE MCKAY		10/22/19	15:10
COMMENTS:			ANALYST (PRINT)			
Please email results to: reid@icbroderick.com			Jimmy Encalada		10/22/19	10:57pm

J.C. BRODERICK & ASSOCIATE

1775 Expressway Drive North ♦ HAUPPAUGE ♦ NEW YORK, 11788 ♦ PHONE: (631) 584-5492 ♦ FAX: (631) 584-3395


J.C. BRODERICK & ASSOCIATE INC.
12
Jacek Mrozek 10/23/19



061923947

BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 4 OF 5

SITE: S.S. Seward Institute MS/HS
 ADDRESS: 51 N Main St, Florida, NY
 DATE: 10/21/19
 CLIENT: Florida Union Free School District
 PROJECT #: 19 - 44304
 ANALYZE EACH MATERIAL TO 1ST POSITIVE


SAMPLER'S NAME: R. Eid, J. Gonzales, J. Mrozek
 SAMPLER'S SIGN: 
 LABORATORY: EMSL
 TURNAROUND TIME: (CIRCLE ONE) 24 HOUR 12 HOUR 6 HOUR OTHER
 MANAGER: R. Eid

HM #	SAMPLE #	MATERIAL DESCRIPTION	SPACE ID / LOCATION	ANALYSIS METHOD		
30	68	Joint Compound	Addition Building / Basement Corridor	ACM		
	69	↓	Addition Building / Room # 151	↓		
	70	↓	Addition Building / Room # 150	↓		
	71	↓	Addition Building / 1 st Floor Corridor	↓		
	72	↓	Addition Building / 2 nd Floor Corridor at Rm # 209	↓		
	73	↓	Addition Building / 2 nd Floor Corridor at Rm # 249	↓		
	74	↓	Addition Building / Room # 251	↓		
31	75	Wall Cinderblock Mortar	Loading Dock	↓		
	76	↓	↓	↓		
32	77	Concrete Stair	↓	↓		
	78	↓	↓	↓		
33	79	Floor Asphalt	Curb Near Dumpster	↓		
	80	↓	Parking Lot	↓		
34	81	Floor Seam Tar (Patch)	Curb Near Dumpster	↓		
	82	↓	Parking Lot	↓		
35	83	Wall Brick Mortar	Original Building / Exterior Elevation	↓		
	84	↓	↓	↓		
36	85	Wall Brick Mortar	Addition Building / Exterior Elevation	↓		
	86	↓	↓	↓		
37	87	Wall Cinderblock Mortar	↓	↓		
	88	↓	↓	↓		
38	89	Expansion Joint Caulking (Dark Gray)	Exterior Elevation	↓		
	90	↓	↓	↓		
SUBMITTED BY (PRINT)		SIGNATURE	RECEIVED BY (PRINT)	SIGNATURE	DATE	TIME
Jacek Mrozek			UNIQUE MCKEY	UNIQUE MCKEY	10/22/19	3:12 PM
COMMENTS:		ANALYST (PRINT)		SIGNATURE	DATE	TIME
Please email results to: reid@icbroderick.com		Jimmy Encalada			10/22/19	10:57 PM

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T.E.M.  10/23/19T.E.M.  10/23/19

BULK SAMPLING CHAIN OF CUSTODY RECORD

PAGE 5 OF 5

SITE: S.S. Seward Institute MS/HS

SAMPLER'S NAME:

R. Eid, J. Gonzales, J. J. Mrazek

ADDRESS: 51 N Main St, Florida, NY

SAMPLER'S SIGN:

DATE: 10/21/19

LABORATORY:

CLIENT: Florida Union Free School District

TURNAROUND TIME:
(CIRCLE ONE)

PROJECT #: 19-44304

XX ANALYZE EACH MATERIAL TO 1ST POSITIVE

MANAGER: R. Eid

[illegible]

J.C. BRODERICK & ASSOCIATE

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ITEM- ~~DL~~ 10/23/19

10/22/19 10:58 pm



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<http://www.EMSL.com / carleplacelab@emsl.com>

EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Attention: Ryan Eid
 J.C. Broderick & Associates
 1775 Expressway Drive North, Suite 1
 Hauppauge, NY 11788

Phone: (631) 584-5492

Fax:

Received Date: 10/22/2019 3:12 PM

Analysis Date: 10/22/2019 - 10/23/2019

Collected Date: 10/21/2019

Project: S.S. Seward Institute MS/HS, 51 N Main St, Florida, NY, Florida Union Free School District, Project # 19-44304

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 1-1 061923947-0001		Description	Library Balcony - Wall Brick Mortar		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Tan		25.00% Ca Carbonate 20.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 1-2 061923947-0002		Description	Library Balcony - Wall Brick Mortar		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Tan		25.00% Ca Carbonate 15.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 2-3 061923947-0003		Description	Library Balcony - Ceiling Plaster		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan/ White		20.00% Ca Carbonate 25.00% Gypsum 15.00% Non-fibrous (other) 40.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 2-4 061923947-0004		Description	Library Balcony - Ceiling Plaster		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan/ White		18.00% Ca Carbonate 20.00% Gypsum 4.00% Mica 13.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 2-5 061923947-0005		Description Homogeneity	Library Balcony - Ceiling Plaster Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan/ White		17.00% Ca Carbonate 23.00% Gypsum 4.00% Mica 12.00% Non-fibrous (other) 44.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 3-6 061923947-0006		Description Homogeneity	Library Balcony - Decorative Wall Coffe/ Plaster Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Tan/ White		25.00% Ca Carbonate 5.00% Mica 15.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 3-7 061923947-0007		Description Homogeneity	Library Balcony - Decorative Wall Coffe/ Plaster Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Tan/ White		25.00% Ca Carbonate 10.00% Gypsum 4.00% Mica 11.00% Non-fibrous (other) 50.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 3-8 061923947-0008		Description Homogeneity	Library Balcony - Decorative Wall Coffe/ Plaster Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Tan/ White		19.00% Ca Carbonate 23.00% Gypsum 13.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 4-9 061923947-0009		Description Homogeneity	Library Balcony - Glue to Floor Carpet Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Yellow		100.00% Other	None Detected

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

		Non-Asbestos			
Test	Analyzed Date	Color	Fibrous	Non-Fibrous	Asbestos
Sample ID 4-10 061923947-0010		Description	Library Balcony - Glue to Floor Carpet		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Yellow		100.00% Other	None Detected
Sample ID 5-11 061923947-0011		Description	Library Balcony - Cove Base		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 5-12 061923947-0012		Description	Library Balcony - Cove Base		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 6-13 061923947-0013		Description	Library Balcony - Glue to Cove Base		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Tan		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Tan		100.00% Other	None Detected
Sample ID 6-14 061923947-0014		Description	Library Balcony - Glue to Cove Base		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Tan		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Tan		100.00% Other	None Detected
Sample ID 7-15 061923947-0015		Description	Security Vestibule - Glue to Floor Carpet		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown		100.00% Other	None Detected

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 7-16 061923947-0016		Description Homogeneity	Security Vestibule - Glue to Floor Carpet Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown/ Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown/ Yellow		100.00% Other	None Detected
Sample ID 8-17 061923947-0017		Description Homogeneity	Security Vestibule - 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 8-18 061923947-0018		Description Homogeneity	Security Vestibule - 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 9-19 061923947-0019		Description Homogeneity	Security Vestibule - Glue to 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Tan		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Tan		100.00% Other	None Detected
Sample ID 9-20 061923947-0020		Description Homogeneity	Security Vestibule - Glue to 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Gray/ Tan		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Gray/ Tan		100.00% Other	None Detected
Sample ID 10-21 061923947-0021		Description Homogeneity	Room #105 - Vapor Barrier below Hardwood Floor Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown/ Black		100.00% Other	None Detected

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

		Non-Asbestos			
Test	Analyzed Date	Color	Fibrous	Non-Fibrous	Asbestos
Sample ID 10-22 061923947-0022		Description	Room #105 - Vapor Barrier below Hardwood Floor		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown/ Black		100.00% Other	None Detected
Sample ID 11-23 061923947-0023		Description	Girl's/Boys Locker Rooms - Wall Brick Mortar		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Various		22.00% Ca Carbonate 22.00% Non-fibrous (other) 56.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 11-24 061923947-0024		Description	Girl's/Boys Locker Rooms - Wall Brick Mortar		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray/ Various	2.00% Cellulose	26.00% Ca Carbonate 19.00% Non-fibrous (other) 53.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 12-25 061923947-0025		Description	Girl's/Boys Locker Rooms - Grout to Ceramic Wall Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	2.00% Cellulose	78.00% Ca Carbonate 20.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 12-26 061923947-0026		Description	Girl's/Boys Locker Rooms - Grout to Ceramic Wall Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	2.00% Cellulose <1.00% Glass	77.00% Ca Carbonate 17.00% Non-fibrous (other) 4.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 13-27 061923947-0027		Description	Girl's/Boys Locker Rooms - Glue to Ceramic Wall Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected

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EMSL Order: 061923947

Customer ID: JC BR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 13-28 061923947-0028		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to Ceramic Wall Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 14-29 061923947-0029		Description Homogeneity	Girl's/Boys Locker Rooms - Grout to Ceramic Floor Tiles Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		35.00% Ca Carbonate 10.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 14-30 061923947-0030		Description Homogeneity	Girl's/Boys Locker Rooms - Grout to Ceramic Floor Tiles Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray	3.00% Cellulose	27.00% Ca Carbonate 10.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 15-31 061923947-0031		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to Ceramic Floor Tiles Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray	3.00% Cellulose	26.00% Ca Carbonate 14.00% Non-fibrous (other) 57.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 15-32 061923947-0032		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to Ceramic Floor Tiles Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		27.00% Ca Carbonate 5.00% Mica 11.00% Non-fibrous (other) 57.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 16-33 061923947-0033		Description Homogeneity	Girl's/Boys Locker Rooms - 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 16-34 061923947-0034		Description Homogeneity	Girl's/Boys Locker Rooms - 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 17-35 061923947-0035		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Black		100.00% Other	None Detected
Sample ID 17-36 061923947-0036		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to 12"x12" Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Black		100.00% Other	None Detected
Sample ID 18-37 061923947-0037		Description Homogeneity	Girl's/Boys Locker Rooms - Vapor Barrier below Hardwood Floor Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown/ Black		100.00% Other	None Detected
Sample ID 18-38 061923947-0038		Description Homogeneity	Girl's/Boys Locker Rooms - Vapor Barrier below Hardwood Floor Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown		100.00% Other	None Detected

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EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 19-39 061923947-0039		Description Homogeneity	Girl's/Boys Locker Rooms - Cove Base Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 19-40 061923947-0040		Description Homogeneity	Girl's/Boys Locker Rooms - Cove Base Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Blue		100.00% Other	None Detected
Sample ID 20-41 061923947-0041		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to Cove Base Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 20-42 061923947-0042		Description Homogeneity	Girl's/Boys Locker Rooms - Glue to Cove Base Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown/ Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown/ Beige		100.00% Other	None Detected
Sample ID 21-43 061923947-0043		Description Homogeneity	Boiler Room - Wall Cinderblock Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		25.00% Ca Carbonate 10.00% Non-fibrous (other) 65.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 21-44 061923947-0044		Description Homogeneity	Boiler Room - Wall Cinderblock Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		26.00% Ca Carbonate 4.00% Matrix 11.00% Non-fibrous (other) 59.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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EMSL Order: 061923947

Customer ID: JCBR50

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Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 22-45 061923947-0045		Description	Electr. Room - Wall Cinderblock Mortar		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		25.00% Ca Carbonate 15.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 22-46 061923947-0046		Description	Electr. Room - Wall Cinderblock Mortar		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		30.00% Ca Carbonate 10.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 23-47 061923947-0047		Description	Cafeteria (Entrance) - 1'x1' Pinhole Spline Ceiling Tile		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Beige	63.00% Min. Wool	37.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Beige		100.00% Other	None Detected
Sample ID 23-48 061923947-0048		Description	Gym Lobby - 1'x1' Pinhole Spline Ceiling Tile		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	65.00% Min. Wool	35.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 24-49 061923947-0049		Description	Basement - 2'x2' Text. Pinhole Ceiling Tile		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	50.00% Min. Wool	50.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 24-50 061923947-0050		Description	Basement - 2'x2' Text. Pinhole Ceiling Tile		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	54.00% Min. Wool	46.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected

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Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 25-51 061923947-0051		Description Homogeneity	Locker Rooms - 2'x4' Pinhole Ceiling Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	34.00% Min. Wool	66.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 25-52 061923947-0052		Description Homogeneity	Locker Rooms - 2'x4' Pinhole Ceiling Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Beige	63.00% Min. Wool	37.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Beige		100.00% Other	None Detected
Sample ID 26-53 061923947-0053		Description Homogeneity	1st Floor/Bathrooms - 2'x2' Pinehole Fissure Ceiling Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	41.00% Min. Wool	59.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 26-54 061923947-0054		Description Homogeneity	2nd Floor/Bathrooms - 2'x2' Pinehole Fissure Ceiling Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	White/ Beige	37.00% Min. Wool	63.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	White/ Beige		100.00% Other	None Detected
Sample ID 27-55 061923947-0055		Description Homogeneity	Original Building at Lunch Room - Drywall/Sheetrock Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	7.00% Cellulose	25.00% Ca Carbonate 55.00% Gypsum 4.00% Mica 9.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 27-56 061923947-0056		Description Homogeneity	Original Building/Basement Corridor - Drywall/Sheetrock Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	6.00% Cellulose	23.00% Ca Carbonate 60.00% Gypsum 3.00% Mica 8.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 27-57 061923947-0057		Description	Original Building/1st Floor Corridor - Drywall/Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan/ White	7.00% Cellulose	30.00% Ca Carbonate 43.00% Gypsum 5.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-58 061923947-0058		Description	Original Building at Lunch Room - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White		78.00% Ca Carbonate 5.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-59 061923947-0059		Description	Original Building/Basement Corridor - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White		75.00% Ca Carbonate 6.00% Mica 19.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-60 061923947-0060		Description	Original Building/1st Floor by Elevator - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		75.00% Ca Carbonate 8.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-61 061923947-0061		Description	Original Building/Girls Locker Room - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		77.00% Ca Carbonate 8.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 28-62 061923947-0062		Description	Original Building/Boys Locker Room - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		75.00% Ca Carbonate 8.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-63 061923947-0063		Description	Original Building/1st Floor Corridor - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		79.00% Ca Carbonate 8.00% Mica 13.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-64 061923947-0064		Description	Original Building/Library - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		78.00% Ca Carbonate 7.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 29-65 061923947-0065		Description	Addition Building/Basement Corridor - Drywall/Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan/ White	7.00% Cellulose	10.00% Ca Carbonate 75.00% Gypsum 8.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 29-66 061923947-0066		Description	Addition Building/1st Floor Corridor - Drywall/Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	7.00% Cellulose	14.00% Ca Carbonate 65.00% Gypsum 4.00% Mica 10.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 29-67 061923947-0067		Description	Addition Building/2nd Floor Corridor - Drywall/Sheetrock		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	7.00% Cellulose	13.00% Ca Carbonate 67.00% Gypsum 4.00% Mica 9.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-68 061923947-0068		Description	Addition Building/Basement Corridor - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		78.00% Ca Carbonate 5.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-69 061923947-0069		Description	Addition Building/Room #151 - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		77.00% Ca Carbonate 6.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-70 061923947-0070		Description	Addition Building/Room #150 - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		78.00% Ca Carbonate 7.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-71 061923947-0071		Description	Addition Building/1st Floor Corridor - Joint Compound		
		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		78.00% Ca Carbonate 8.00% Mica 14.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 30-72 061923947-0072			Description Addition Building/2nd Floor Corridor at Rm #209 - Joint Compound Homogeneity Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple	<1.00% Cellulose	75.00% Ca Carbonate 8.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-73 061923947-0073			Description Addition Building/2nd Floor Corridor at Rm #249 - Joint Compound Homogeneity Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		77.00% Ca Carbonate 8.00% Mica 15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30-74 061923947-0074			Description Addition Building/Room #251 - Joint Compound Homogeneity Heterogeneous		
PLM NYS 198.1 Friable	10/22/2019	White/ Purple		76.00% Ca Carbonate 7.00% Mica 17.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 31-75 061923947-0075			Description Loading Dock - Wall Cinderblock Mortar Homogeneity Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		25.00% Ca Carbonate 15.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 31-76 061923947-0076			Description Loading Dock - Wall Cinderblock Mortar Homogeneity Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		20.00% Ca Carbonate 10.00% Non-fibrous (other) 70.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 32-77 061923947-0077		Description Homogeneity	Loading Dock - Concrete Stair Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		25.00% Ca Carbonate 20.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 32-78 061923947-0078		Description Homogeneity	Loading Dock - Concrete Stair Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Gray		30.00% Ca Carbonate 18.00% Non-fibrous (other) 52.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 33-79 061923947-0079		Description Homogeneity	Curb Near Dumpster - Floor Asphalt Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown		100.00% Other	None Detected
Sample ID 33-80 061923947-0080		Description Homogeneity	Parking Lot - Floor Asphalt Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Brown		100.00% Other	None Detected
Sample ID 34-81 061923947-0081		Description Homogeneity	Curb Near Dumpster - Floor Seam Tar (Patch) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Black		100.00% Other	None Detected
Sample ID 34-82 061923947-0082		Description Homogeneity	Parking Lot - Floor Seam Tar (Patch) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Black		100.00% Other	None Detected

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Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 35-83 061923947-0083		Description Homogeneity	Original Building/Exterior Elevation - Wall Brick Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Brown/ Red		24.00% Ca Carbonate 26.00% Non-fibrous (other) 50.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 35-84 061923947-0084		Description Homogeneity	Original Building/Exterior Elevation - Wall Brick Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Brown/ Tan		20.00% Ca Carbonate 27.00% Non-fibrous (other) 53.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 36-85 061923947-0085		Description Homogeneity	Addition Building/Exterior Elevation - Wall Brick Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		25.00% Ca Carbonate 5.00% Mica 10.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 36-86 061923947-0086		Description Homogeneity	Addition Building/Exterior Elevation - Wall Brick Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan	2.00% Cellulose	25.00% Ca Carbonate 15.00% Non-fibrous (other) 58.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 37-87 061923947-0087		Description Homogeneity	Addition Building/Exterior Elevation - Wall Cinderblock Mortar Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		25.00% Ca Carbonate 5.00% Mica 10.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 37-88 061923947-0088		Description	Addition Building/Exterior Elevation - Wall Cinderblock Mortar		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	10/22/2019	Tan		25.00% Ca Carbonate 5.00% Mica 10.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 38-89 061923947-0089		Description	Exterior Elevation - Expansion Joint Caulking (Dark Gray)		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Gray/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Gray/ Black		100.00% Other	None Detected
Sample ID 38-90 061923947-0090		Description	Exterior Elevation - Expansion Joint Caulking (Dark Gray)		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Gray/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Gray/ Black		100.00% Other	None Detected
Sample ID 39-91 061923947-0091		Description	Exterior Elevation - Expansion Joint Caulking (Beige)		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Beige		100.00% Other	None Detected
Sample ID 39-92 061923947-0092		Description	Exterior Elevation - Expansion Joint Caulking (Beige)		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	10/23/2019	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	10/23/2019	Beige		100.00% Other	None Detected

Initial report from: 10/23/2019 16:35:23



EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / carleplacelab@emsl.com

EMSL Order: 061923947

Customer ID: JCBR50

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date: 10/22/2019

Sample Receipt Time: 3:12 PM

Analysis Completed Date: 10/22/2019

Analysis Completed Time: 8:34 PM

Analyst(s):

Jimmy Encalada PLM NYS 198.1 Friable (50)

Tomas Montes De Oca PLM NYS 198.6 NOB (42)

Jackson Li TEM NYS 198.4 NOB (42)

Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

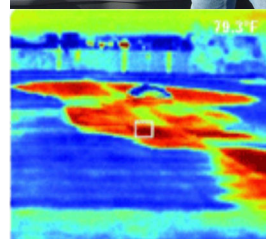
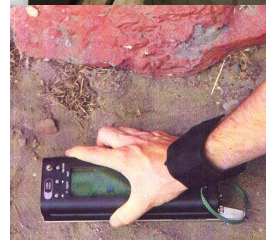
-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 10/23/2019 16:35:23

Laboratory Certifications



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

1775 Expressway Drive North

Hauppauge, New York 11788

631.584.5492 fax 631.584.3395

**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**



**Expires 12:01 AM April 01, 2020
Issued April 01, 2019**

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE
Issued in accordance with and pursuant to section 502 Public Health Law of New York State

**MR. DANIEL CLARKE
EMSL ANALYTICAL, INC.
528 MINEOLA AVE.
CARLE PLACE, NY 11514**

NY Lab Id No: 11469

***Is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:***

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3051A

Serial No.: 59670

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101048-10

EMSL Analytical, Inc.
Carle Place, NY

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

Asbestos Fiber Analysis

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

2019-07-01 through 2020-06-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EMSL Analytical, Inc.
528 Mineola Ave.
Carle Place, NY 11514
Daniel Clarke
Phone: 516-997-7251
Email: dclarke@emsl.com
<http://www.emsl.com>

ASBESTOS FIBER ANALYSIS

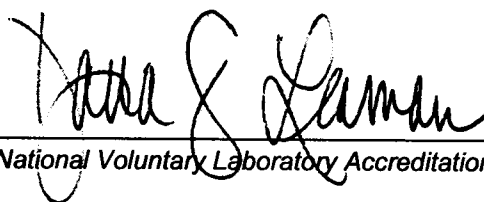
NVLAP LAB CODE 101048-10

Bulk Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

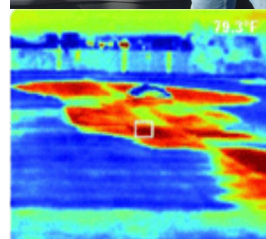
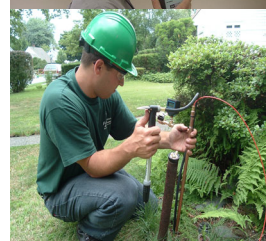
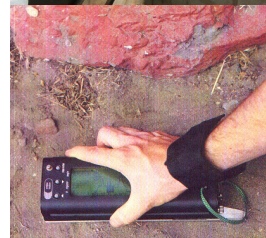
Airborne Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.



For the National Voluntary Laboratory Accreditation Program

JCB Certifications



J.C. Broderick & Associates, Inc.

Environmental Consulting & Testing

1775 Expressway Drive North

Hauppauge, New York 11788

631.584.5492 fax 631.584.3395

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

J.C. Broderick & Associates Inc.

1775 Expressway Drive No.

Hauppauge, NY 11788

FILE NUMBER: 99-0503

LICENSE NUMBER: 28731

LICENSE CLASS: RESTRICTED

DATE OF ISSUE: 05/17/2019

EXPIRATION DATE: 05/31/2020

Duly Authorized Representative – Brendan Broderick:

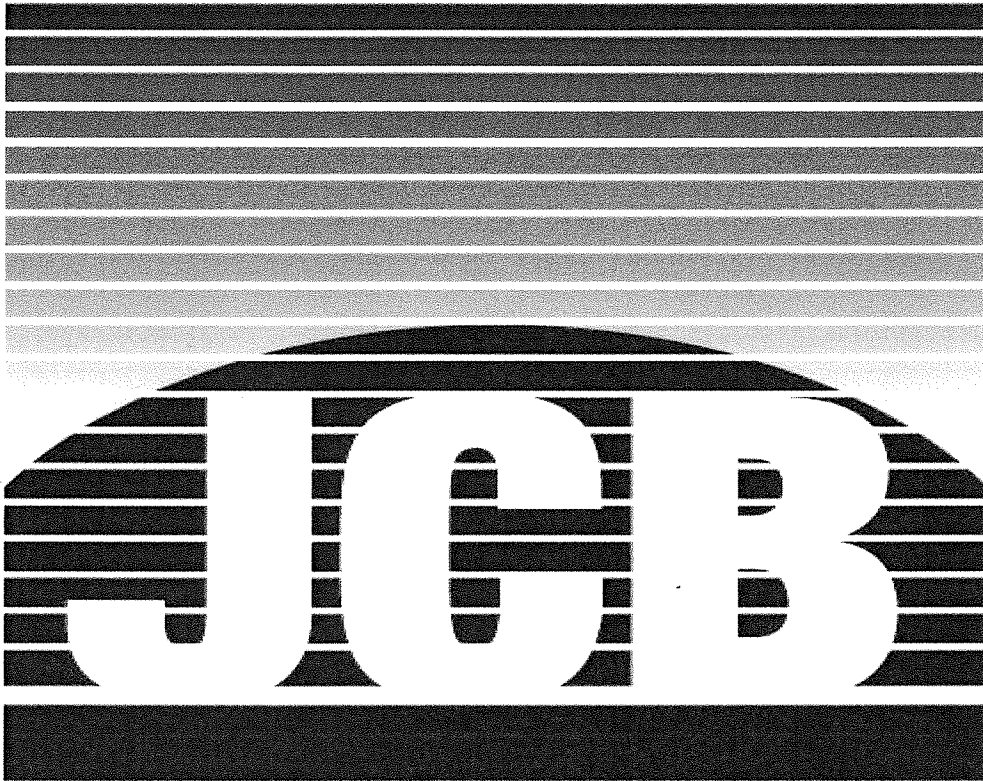
This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director
For the Commissioner of Labor

J.C. Broderick & Associates, Inc.



Ryan Eid

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



RYAN C EID
CLASS(EXPIRES)
C ATEC(10/20) D INSP(10/20)
E MGPL(10/19) H PM (10/20)
I PD (10/20)

CERT# 04-07665

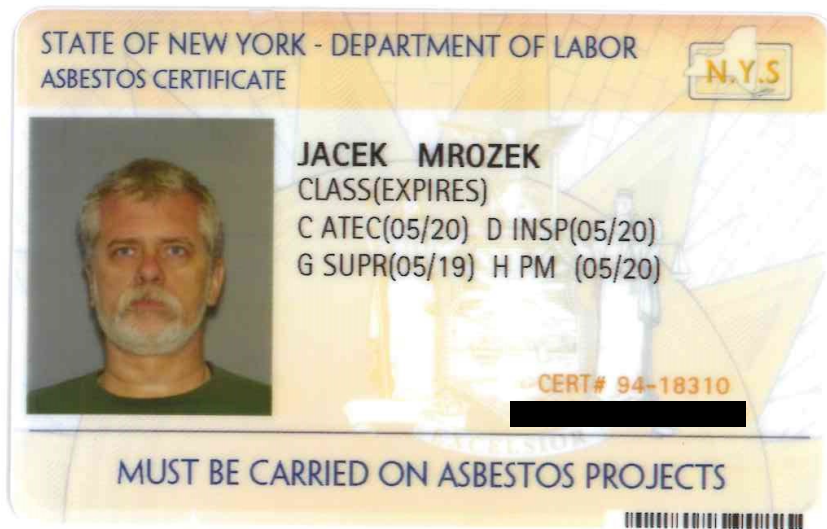
MUST BE CARRIED ON ASBESTOS PROJECTS



J.C. Broderick & Associates, Inc.



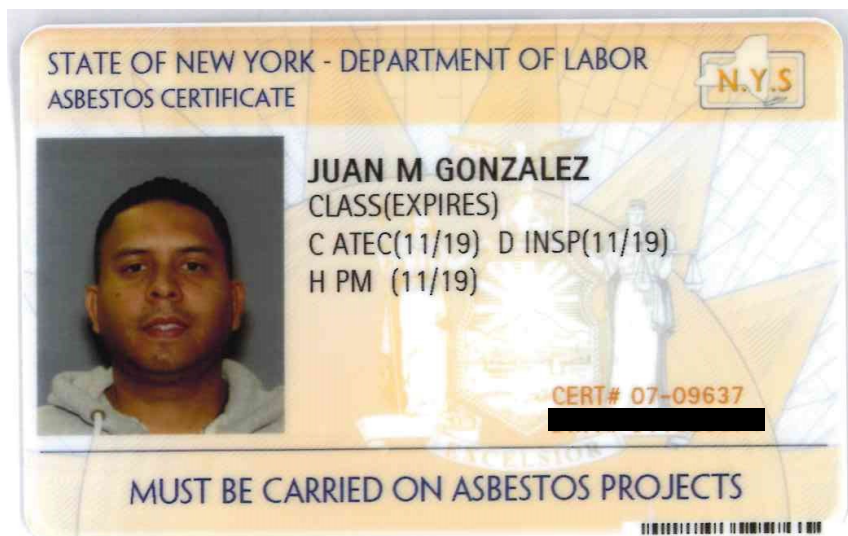
Jacek Mrozek



J.C. Broderick & Associates, Inc.



Juan M. Gonzalez



Florida Union Free School District
51 North Main Street
Florida, New York 10921-0757

Attention: Mr. Howard Cohen – School Business Official
c/o: Mr. James P. Walsh – BBS Architects, Landscape Architects & Engineers, PC.
VIA E-MAIL: (jwalsh@bbsarch.com)

August 28, 2020

**RE: W.O. 10537.01
GEOTECHNICAL ENGINEERING EVALUATION
PARKING AND BUS LOOP IMPROVEMENTS
NEW LIVE GOLDEN HILL ELEMENTARY SCHOOL & S.S. SEWARD INSTITUTE
FLORIDA UNION FREE SCHOOL DISTRICT
51 NORTH MAIN STREET
VILLAGE OF FLORIDA, ORANGE COUNTY, NEW YORK**

Dear Mr. Walsh:

In accordance with your request and authorization, Tectonic Engineering Consultants, Geologists & Land Surveyors D.P.C. (Tectonic) has completed a geotechnical investigation and engineering evaluation for the above referenced project. The purpose was to evaluate the subsurface conditions across the project sites and provide recommendations related to the design and construction of new paved parking lots and bus loops at Golden Hill Elementary School and S.S. Seward Institute. This letter report provides the results of the investigations and our recommendations.

1.0 SCOPE OF SERVICES

The following services were performed for the Florida Union Free School District, hereafter referred to as Client, and coordinated through BBS Architects, Landscape Architects & Engineers, PC, herein referred to as Client Agent.

- Drilling, sampling, and logging of ten (10) test borings at the Golden Hill Elementary School site.
- Drilling, sampling, and logging of eight (8) test borings at the S.S. Seward Institute site.
- Field inspection of the test borings by geotechnical engineers.
- Laboratory testing of soil samples selected to assist in evaluation of engineering properties of the subgrade materials.
- Geotechnical engineering evaluation of the subsurface conditions as they relate to design and construction of the proposed pavement sections.
- Preparation of this geotechnical letter report presenting the results of the performed investigations, engineering analyses, and our geotechnical recommendations for design and construction of the proposed parking lot pavement sections.

2.0 SITE AND PROJECT DESCRIPTION

The above referenced project consists of two schools within the Florida Union Free School District. The first project site, located on the campus of Golden Hill Elementary School, is located at 478 Round Hill Road, in the Village of Florida, Orange County, New York. Currently, the project site consists of an existing central asphalt paved parking lot

Newburgh Office

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tectonicengineering.com
Equal Opportunity Employer

with an associated bus loop, which runs along the southern perimeter of the parking lot. The site is bound by a line of trees to the north, the school building to the south, Roe Street to the east, and a connector road to Round Hill Road to the west. A topographic survey was performed by Tectonic on July 20, 2020. The project site generally slopes downwards from the west to the east, with ground surface elevations ranging from approximately +454 to +440 feet, as per the North American Vertical Datum of 1988 (NAVD88). All elevations provided herein reference NAVD88.

The second project site, on the campus of the S.S. Seward Institute, is located at 51 North Main Street, in the Village of Florida, Orange County, New York. Currently, the project site consists of an upper, larger parking lot, and a lower, smaller parking lot, both located to the north of the school building. The upper parking lot consists of four rows of parking, with two drive aisles. The lower parking lot consists of two rows of parking, with two drive aisles. The project site is bound by Farries Avenue to the north, the school building to the south, residential buildings and a parking lot to the west, and residential buildings to the east. The upper parking lot has access from Farries Road, and the lower parking lot has access from North Main Street. A topographic survey was performed by Tectonic on July 20, 2020. The project site generally slopes downward from the south to the north, with ground surface elevations ranging from +452 to +443 feet.

As per information provided by the Client Agent, the planned improvements at both sites will consist of the reconstruction of the existing parking lots and bus loops, as well as the associated amenities. Based on on-site visual observations at both sites, the asphalt paving sections show areas of cracking, and numerous areas of patching. No other site improvements are proposed as of the writing of this report.

3.0 SUBSURFACE INVESTIGATION – GOLDEN HILLS ELEMENTARY SCHOOL

The subsurface investigation at Golden Hill Elementary School consisted of the drilling, sampling, and logging of eleven (11) test borings, designated as TB-1 through TB-10, and TB-1A, which was offset approximately 10 feet southeast of TB-1. The boring locations are shown on the attached Boring Location Plan, Figure 1.

The borings were performed by Core Down Drilling LLC., (CDD) on July 20, 2020, using a track-mounted Geoprobe 7822DT drill rig, equipped with an automatic hammer, and were advanced to depths ranging from 4.5 to 12 feet below ground surface (bgs). Upon completion, the borings were backfilled with the drill cuttings, and cold patched with asphalt, as required.

Standard Penetration Testing (SPT) and split-spoon sampling was generally performed continuously to depths of approximately 6 to 8 feet, and then again at the 10 to 12 foot interval. SPT sampling was performed in general accordance with the requirements of ASTM Standard D1586 “*Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*”. The field SPT N-values were recorded for each penetration test and samples of the soils obtained during the investigation were collected and retained in glass jars and are currently stored at our material testing laboratory.

A geotechnical engineer observed the subsurface investigations and prepared logs of the subsurface conditions under the direction of a Professional Engineer licensed in New York State. The materials encountered were classified in accordance with the Burmister Soil Classification System, the Unified Soil Classification System (ASTM D2488) and in accordance with table 1806.2 of the Building Code. Note, for the purposes of this report the term “Building Code” applies to both the International Building Code and the New York State Building Code. Copies of the boring logs are attached to this letter report.

4.0 SUBSURFACE INVESTIGATION – S.S. SEWARD INSTITUTE

The subsurface investigation at the S.S. Seward Institute consisted of the drilling, sampling, and logging of eight (8) test borings, designated as TB-1 through TB-8. The boring locations are shown on the attached Boring Location Plan, Figure 1.

The borings were performed by Core Down Drilling LLC., (CDD) on July 21, 2020, using a track-mounted Geoprobe 7822DT drill rig, equipped with an automatic hammer, and were advanced to depths ranging from 6.1 to 12 feet bgs. Upon completion, the borings were backfilled with the drill cuttings, and cold patched with asphalt, as required.

SPT and split-spoon sampling was generally performed continuously to a depth of up to approximately 8 feet, and then at the 10 to 12 foot depth interval. SPT sampling was performed in general accordance with the requirements of ASTM Standard D1586 “*Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*”. The field SPT N-values were recorded for each penetration test and samples of the soils obtained during the investigation were collected and retained in glass jars and are currently stored at our material testing laboratory.

A geotechnical engineer observed the subsurface investigations and prepared logs of the subsurface conditions under the direction of a Professional Engineer licensed in New York State. The materials encountered were classified in accordance with the Burmister Soil Classification System, the Unified Soil Classification System (ASTM D2488) and in accordance with table 1806.2 of the Building Code. Copies of the boring logs are attached to this letter report.

5.0 LABORATORY TESTING

Laboratory testing was performed on select soil samples to assist in evaluating the engineering properties of, and to assist in the classification of the soils. Testing at the Golden Hills Elementary School site consisted of the performance of three (3) gradation analyses, performed in accordance with ASTM Standard D6913. Testing at the S.S. Seward Institute consisted of the performance of two (2) gradation analyses, and one (1) Atterberg Limits determination, performed in accordance with ASTM Standard D4318. The results of the laboratory testing are attached.

6.0 SUBSURFACE CONDITIONS – GOLDEN HILLS ELEMENTARY SCHOOL

The encountered subsurface conditions generally consist, in turn, of existing fill native sand and gravel soils, and bedrock. The following subsections provide generalized descriptions of the soil and groundwater conditions. More detailed descriptions of the subsurface conditions are provided in the attached boring logs.

As noted previously, an automatic hammer was used for the SPT testing. An energy correction is typically used to convert the field N-values for the automatic hammer used by the drillers to those of a safety hammer (N_{60}), which is the standard used for most geotechnical engineering calculations. A correction factor of 1.3 is applied to the field N-values to calculate the N_{60} -values.

6.1 Pavement Section

The existing pavement section at the boring locations typically consisted of 2 to 6 inches of asphalt pavement, and 2 to 4 inches of underlying subbase gravel. The average pavement section thickness was about 4 inches of asphalt concrete overlying 2 to 3 inches of gravel subbase. The following table summarizes the encountered pavement section thickness.

Table 6.1: Asphalt and Sub-Base Gravel Thicknesses at Golden Hills Elementary School		
Boring ID	Asphalt Layer (in)	Sub-Base Gravel Layer (in)
TB-1	4.0	2.0
TB-2	5.0	3.0
TB-3	6.0	4.0
TB-4	5.0	2.0
TB-5	4.0	2.0
TB-6	4.0	2.0
TB-7	4.0	2.0
TB-8	4.0	3.0
TB-9	2.0	3.0
TB-10	3.0	2.0

6.2 Fill

Fill soils typically consisted of coarse to fine sand, and/or coarse to fine gravel, with varying amounts of silt. The fill was encountered up to approximately 4 feet bgs within all of the borings. Laboratory testing of the fill soils indicated up to 45 percent gravel, up to 39 percent sand, and up to 43 percent silt. It should be noted that fill soils may be encountered during construction in other areas across the site.

SPT N_{60} -values within the fill indicate that it generally ranges from medium dense to very dense, with SPT N_{60} -values ranging from approximately 22 to 72 blows per foot (bpf). The fill has USCS designations of GP, GM, SP and SM.

6.3 Native Soils

Underlying the fill, layers of brown, coarse to fine sand and gravel were largely encountered to the termination depth explored in all of the borings. Noted exceptions were in borings TB-3 (approximately 4 to 6 feet bgs); and boring TB-5 (approximately 2 to 4 feet bgs) where layers of silt, with varying amounts of coarse to fine sand and gravel were encountered.

SPT N_{60} -values in the native soils range from approximately 8 to 70 bpf, indicating a loose to very dense condition. Loose soils were encountered in boring TB-2 at a depth of between 10 to 12 feet, and in boring TB-6 at depths of between 4 to 6 feet. However, the majority of the native soils were observed in a medium dense to very dense condition. Additionally, split spoon sampler refusal, which is defined as less than 6 inches of sampler penetration for 50 blows of the hammer, was encountered in borings TB-1, TB-7, TB-8, TB-9, and TB-10, at depths ranging between approximately 4.3 to 12.5 feet bgs. Due to the presence of fractured rock as observed in the split-spoon samples, it is likely that spoon refusal was encountered on bedrock. Borings TB-1, TB-1A, TB-2, TB-5, TB-9, and TB-10 were terminated on auger refusal at depths ranging from 4.5 to 12.5 feet bgs on apparent weathered bedrock. The native soils have USCS classification of SM, ML, GM, and GP.

6.4 Groundwater

Saturated soil conditions were not observed in any of the borings, to the termination depth of up to 12 feet. It is also noted that groundwater levels fluctuate seasonally and with changing weather conditions. Consequently, groundwater should be anticipated to be encountered at other depths at other times.

7.0 SUBSURFACE CONDITIONS – S.S. SEWARD INSTITUTE

7.1 Pavement Section

The existing pavement section at the boring locations typically consisted of 1.5 to 5 inches of asphalt pavement, and 1 to 5 inches of underlying subbase gravel. The average pavement section thickness was 3 inches of asphalt concrete overlying about 2 inches of gravel subbase. The following table summarizes the encountered pavement section thickness.

Table 7.1: Asphalt and Sub-Base Gravel Thicknesses at S.S. Seward Institute		
Boring ID	Asphalt Layer (in)	Sub-Base Gravel Layer (in)
TB-1	3.0	1.0
TB-2	5.0	1.0
TB-3	3.5	1.0
TB-4	2.0	3.0
TB-5	1.5	2.0
TB-6	3.5	5.0
TB-7	3.0	1.0
TB-8	2.5	3.0

7.2 Fill

Fill soils typically consisting of coarse to fine sand, and/or coarse to fine gravel, with varying amounts of silt, were encountered up to approximately 4 feet bgs within borings TB-1, TB-3, TB-4, TB-5, TB-6, and TB-7. The fill predominantly consists of granular soils. Laboratory testing of the fill soils indicated up to 45 percent gravel, 45 percent sand and 17 percent silt and clay. It should be noted that fill soils may be encountered during construction in other areas across the site. SPT N_{60} -values within the fill ranged from 16 to 45, which correspond to medium dense to very dense conditions. The fill has USCS designations of GP, GM, and SM.

7.3 Native Soils

Underlying the fill in borings TB-1, TB-3, TB-4, TB-5, TB-6, and TB-7, and underlying the asphalt and subbase gravel in the remaining borings, layers of brown silt or clay, with varying amounts of coarse to fine sand and gravel were encountered. Interbedded layers of coarse-to-fine sand and gravel were encountered in borings TB-3, TB-4, and TB-7, at depths of between 4 and 6.5 feet. Laboratory results performed on the silt in boring TB-2 indicate a liquid limit of 23 and plasticity index of 9.

SPT N_{60} -values in the native silts range from approximately 4 to 27 bpf, indicating a soft to very stiff consistency. Soft layers of silt were encountered in borings TB-1 between 4 to 6 feet bgs, and in boring TB-2 at depths of between 2 to 4 feet bgs.

SPT N_{60} -values in the native sand and gravel layers ranged from 0 bpf to sampler refusal, indicating a very loose to very dense condition. A layer of very loose sand was observed in boring TB-3, between 4 and 6 feet bgs, in which the split spoon advanced under the weight of the automatic hammer. The sands and gravels were otherwise generally observed in a medium dense to very dense condition.

Additionally, split spoon sampler refusal was encountered in borings TB-3, TB-4, TB-5, TB-6, and TB-8, at depths ranging between approximately 6.1 to 11.5 feet bgs. Due to the presence of fractured rock in observed in the split-spoon samples, it is likely that spoon refusal was encountered on bedrock. Borings TB-1 through TB-5 were terminated on auger refusal at depths ranging from 6.1 to 10.3 feet bgs on apparent weathered bedrock. The native soils have USCS classification of SM, ML, CL, and GM.

7.4 Groundwater

Saturated soil conditions were not observed in any of the borings, to the termination depth of up to 12 feet. It is also noted that groundwater levels fluctuate seasonally and with changing weather conditions. Consequently, groundwater should be anticipated to be encountered at other depths at other times.

8.0 SEISMIC SITE COEFFICIENTS AND LIQUEFACTION POTENTIAL

We have evaluated the conditions at both sites to obtain an appropriate site coefficient for use in seismic design. These analyses were based on the subsurface conditions, published correlations between N_{60} -values and the shear wave velocities of various soils, and the criteria outlined in the current edition of the Building Code. The soils underlying the proposed building should be considered to have a Site Classification of D, with maximum spectral response accelerations at short periods (S_{MS}) equal to 0.374g and at a 1-second period (S_{M1}) equal to 0.135g. Based on the procedures outlined in the Building Code, the corresponding five-percent damped design spectral response acceleration at short periods (S_{DS}) is equal to 0.249g, and at a 1-second period (S_{D1}) is equal to 0.090g.

In addition to evaluating the site classification and spectral accelerations, we have also evaluated the liquefaction potential of the soils underlying the site. Based on the results of the subsurface investigation and the criteria outlined in Section 1813 of the Building Code, a procedure recommended by Youd et. al. (2001) was used to evaluate the liquefaction potential. This method estimates the stresses likely to be induced by an earthquake, the stresses likely to initiate liquefaction using the SPT blow counts, and the effective overburden pressure caused by the design seismic event ($M = 5.52$), as specified by the Building Code. These values were used, in combination with an analysis PHGA of 0.137g, to assess the liquefaction potential within the soils at the site. The factors of safety against liquefaction were computed by the ratio of cyclic shear strength of the soil to the cyclic shear stress induced by the seismic event. The factor of safety against liquefaction was found to be well above the generally accepted minimum of 1.0, and therefore, it is our conclusion that the soils underlying the site are unlikely to liquefy, if the design earthquake should occur.

9.0 DISCUSSION AND CONCLUSIONS

The main geotechnical issues at the site associated with new asphalt pavements are the relatively high fines content of the soils and isolated locations where the upper soils were encountered in a loose condition. At the Golden Hill Elementary School, the pavement is generally supported by fill and/or native soils that were generally found to be in a

medium dense to dense condition. At the S.S. Seward Institute, the pavement is generally supported by fill and/or native soils that were generally encountered to have a soft consistency, particularly in the southern portion of the site, near the lower parking lot. Other issues that dictate the design of pavement are the anticipated traffic count and the types of vehicles that will use the parking lot/driveway areas, which are currently unknown at this time.

The existing asphalt sections at Golden Hills Elementary School are largely supported by fill and/or native soils that were observed to have a relatively high fines content in several of the borings. The existing fill is generally in a medium dense to dense condition, and should be suitable for supporting new asphalt sections. Relatively shallow auger and spoon refusals likely indicate bedrock at depths of between 4.5 to 12.5 feet.

The existing asphalt sections at S.S. Seward Institute are generally supported by medium dense to dense fill and/or native soils, with pockets of soft to medium stiff silts. Pockets of soft silt were observed in the lower parking lot, at depths of between 2 and 4 feet. Deeper pockets of relatively soft silt were also encountered in the western portion of the upper parking lot, at depths of between 10 to 12 feet in boring TB-7. A very loose layer of sand was encountered between 4 and 6 feet in boring TB-3. The existing fill/native soil subgrades are generally suitable for support of the new asphalt pavement sections. All loose and/or soft soils observed during proofrolling should be removed and be replaced with properly compacted fill. Relatively shallow auger and spoon refusals likely indicate bedrock at depths of between 6.1 to 11.5 feet.

It is anticipated that the traffic at both school sites will be relatively light, given the limited number of parking spaces, and pavement recommendations are provided for both light-duty pavement (where traffic will mainly be from passenger vehicles) and heavy-duty pavement (where traffic will mainly be from heavy trucks or busses). Additionally, due to the high fines content of the fill and native soils, frost heave susceptibility should be considered with regard to longevity of the pavement. Full protection against frost heave would require placement of granular soil to the estimated depth of frost penetration. Full protection against frost is not typically designed for and is costly. To provide partial frost heave protection, we recommend that a layer of granular structural fill at least 12 inches in thickness be placed between the existing fill / native soils and the pavement gravel subbase. The subgrade after the 12-inch removal should be proofrolled and prepared as recommended in Section 12.

Other geotechnical considerations in regards to the design and construction of the proposed parking lot include the following:

- Excavation within the existing fill and native soils should be feasible with conventional construction equipment.
- The existing fill and native soils are likely not suitable for re-use as select granular fill due to the high fines content.
- Saturated soil conditions were not encountered within the borings at either site; it is not expected that groundwater will be encountered during excavation or grading operations.
- The soils underlying the site are unlikely to liquify during the design earthquake.

10.0 PAVEMENT RECOMMENDATIONS

All work should conform to the New York State Building Code and other applicable regulations. The following paragraphs provide our geotechnical recommendations for the proposed construction of an asphalt paved parking lot. The recommendations are based on our understanding of the proposed construction as described in Sections 1 through

2, the results of investigations, as described in Sections 3 through 7 above, and our experience with other projects in the general vicinity of the current project site.

10.1 Design for Asphalt Pavement Sections

The proposed asphalt pavement can be supported on properly placed and compacted aggregate subbase after at least the upper 1-foot of subgrade soils underlying the existing asphalt pavement section have been removed and replaced with non-expansive granular controlled fill. The recommendations presented in Section 12 of this report should also be incorporated into the design and construction of the pavement sections. In areas where the native clay soils are encountered immediately underlying the existing asphalt pavement subbase (mainly the lower parking areas of S.S. Seward Institute), a geogrid (Tensar Biaxial Geogrid BX1100, or similar) should be placed between the clay soils and the above recommended 1-foot layer of non-expansive granular controlled fill. The existing asphalt pavement should be removed and any planned site grading should be performed to achieve the grades appropriate for the pavement sections recommended below. Following any planned cutting, or prior to any planned filling, the exposed subgrade should be proofrolled, and accepted by the geotechnical engineer prior to construction of the pavement sections or the placement of the separation fabric. Subgrade preparation and proofrolling should be performed in accordance with the recommendations provided in Section 12.2 of this report.

For this report, the pavement design parameters were estimated by Tectonic. A California Bearing Ratio (CBR) of 10 percent was assumed for Golden Hills Elementary School, and a CBR of 5 percent was assumed for the S.S. Seward Institute. An assumed twenty (20) year design life were also used for designing the pavement sections.

It is our understanding that the parking lots may service both passenger vehicles (primarily school district employee), as well as busses and heavy trucks (emergency vehicles and delivery). Recommendations for both light-duty and heavy-duty asphalt concrete pavements are presented in the following table, along with recommended NYSDOT Item numbers. The light-duty pavement section assumes that few heavy-duty (delivery or tractor-trailer) trucks will use the parking lot, or select portions of it, such as parking spaces. The light-duty pavement section assumes a maximum of 120,000 Equivalent Single Axle Loads (ESALs) through the design life. The heavy-duty pavement section assumes that heavy-duty trucks will access the parking lot, or select portions of it, such as the drive isles. The heavy-duty pavement section assumes a maximum of 400,000 ESALs through the design life of the parking lot.

Table 10.1 - Asphalt Concrete Pavement Sections – Golden Hills Elementary	
Pavement Section Type	Recommended Section
Light-Duty Flexible Pavement	2 inches Top Course HMA (Items 402.095102 or 402.125102) 2 inches Binder Course HMA (Item 402.195102 or 402.255902) 4 inches Type 2 Aggregate Subbase (Item 304.12)
Heavy-Duty Flexible Pavement	2 inches Top Course HMA (Items 402.095102 or 402.125102) 4 inches Binder Course HMA (Item 402.195102 or 402.255902) 6 inches Type 2 Aggregate Subbase (Item 304.12)

Table 10.2 - Asphalt Concrete Pavement Sections – S.S. Seward Institute	
Pavement Section Type	Recommended Section
Light-Duty Flexible Pavement	2 inches Top Course HMA (Items 402.095102 or 402.125102) 2 ½ inches Binder Course HMA (Item 402.195102 or 402.255902) 4 inches Type 2 Aggregate Subbase (Item 304.12)
Heavy-Duty Flexible Pavement	2 inches Top Course HMA (Items 402.095102 or 402.125102) 4 inches Binder Course HMA (Item 402.195102 or 402.255902) 8 inches Type 2 Aggregate Subbase (Item 304.12)

Notes:

1. Heavy-Duty pavement should be placed where busses, delivery trucks or tractor trailer trucks will travel.
2. Light-Duty pavement should only be placed in areas that will primarily be used by passenger vehicles, such as school district personal parking areas.

11.0 EARTHWORK CONSTRUCTION CRITERIA

The following sub-sections provide our recommendations regarding earthwork construction.

11.1 General Site Preparation

Any existing structures, existing pavement, topsoil and/or upper disturbed soils, underground utilities and other deleterious materials should be removed, as necessary, from the site and disposed of at a legal disposal facility. Existing utilities within the project limits should be re-routed or protected from damage by construction equipment. The area to be stripped and grubbed should extend at least 2 feet beyond the edge of the planned pavement, or to the construction limits, whichever comes first.

11.2 Subgrade Preparation

As it is Tectonic's understanding that the existing pavement section is to be removed and replaced, all existing asphalt should be stripped from the areas of improvement and be either recycled or disposed of at a legal facility. The site should then be cut a minimum of 12 inches to reduce the potential for frost heave. The exposed existing fill or native soils should then be proofrolled to observe for any potentially yielding soils. We recommend that the contractor proofroll the subgrade by making a minimum of six (6) passes in two perpendicular directions with a static steel drum roller, having a static weight of at least 10-tons.

The proofrolling should be performed under the full-time observation of the geotechnical engineer, to allow for identification of any weak, yielding areas that may not be suitable for supporting the pavement section. However, it should be noted that proofrolling soils that are too wet will create unstable conditions; therefore, proofrolling should only be performed in the dry. Due to the relatively high silt and clay contents, the on-site soils are very moisture sensitive, and therefore will readily soften when exposed to moisture, wet weather, and construction traffic. Construction traffic should be confined as much as possible to designated haul roads to minimize disturbance of the on-site soils. Wet areas should be allowed to dry before proofrolling is performed. Any subgrade soils found to be soft and yielding during proofrolling, or otherwise deemed unsuitable by the geotechnical engineer, should be removed and replaced with properly compacted select granular fill. In areas of exposed clayey subgrades, or if deemed necessary during excavation, reinforcing geostabilization fabric or geogrid (Tensar Biaxial Geogrid BX1100, or similar) should be used to augment the stability of the over-excavated area, as recommended during proofrolling by the geotechnical engineer.

11.3 Fill and Backfill Materials

All soil and asphalt materials recommended herein should meet the requirements given in the latest edition of the NYSDOT Standard Specifications. Any new fill to be placed for site grading or to backfill excavations, resulting from the removal of underground structures, should meet the following requirements for Select Granular Fill or Type 2 Aggregate Subbase. Specifically, select granular fill should be a well-graded durable granular material that meets the gradation requirements for NYSDOT Select Granular Fill (Item No. 733.1302), as follows:

NYSDOT Select Granular Fill	
Sieve Size	Percent Finer by Weight
4 Inch	100
No. 40	0-70
No. 200	0-15

Based on the laboratory testing performed on the existing fill at the site, it is not expected that the on-site soils will meet the above requirements for select granular fill. Additionally, any particles and/or debris that has a diameter larger than 4 inches, along with wood and other deleterious materials, should be removed. Further laboratory testing should be performed on any on-site soils that the contractor wishes to use as Select Granular Fill.

Type 2 Aggregate Subbase (Item 304.12), to be placed immediately below the asphalt pavement, or as fill or backfill, should be a well-graded durable granular material that meets the gradation requirements for NYSDOT Type 2 Subbase (Item No. 733.0402), as follows:

NYSDOT Type 2 Aggregate Subbase	
Sieve Size	Percent Finer by Weight
2 Inch	100
¼ Inch	25-60
No. 40	5-40
No. 200	0-10

All subbase gravel and select granular fill should be compacted, at a moisture content that is within 2 percent of the optimum moisture content, to a density of at least 95 percent of the maximum dry density, as determined in the laboratory, in accordance with ASTM D1557. Fill placed in landscaped areas (that will not support structures or pavement) should be compacted, at a moisture that is within 3 percent of the optimum moisture content, to a density of at least 90 percent of the maximum dry density, as determined in the laboratory, in accordance with ASTM D1557.

The contractor should expect that they will need to import subbase material for construction of the pavement section. The on-site soils may also be used as general fill for re-grading landscaped areas, if necessary and approved by the landscape architect.

All fill placements should be observed and tested for density by the geotechnical engineer. Fill placed in open areas should be placed in lifts having a maximum loose thickness of 12 inches. A maximum loose lift thickness of 4 inches should be used when working in confined areas using hand-operated compaction equipment such as jumping jack tampers or vibrating plate compactors. Even thinner lift thicknesses may

be necessary when small compactors are used. The maximum allowable loose lift thickness should be confirmed during placement based on the field density test-results.

11.4 Excavations, Shoring and Dewatering

If necessary, temporary excavation slopes should conform to the latest OSHA standards, including slopes permitted for specified heights and soil conditions encountered. Based on the boring data, the existing on-site fill soils should be considered Type C soils, per the OSHA 1926 Subpart P, Appendix B. Excavations into the existing fill should be feasible using standard heavy-duty construction equipment.

Design of excavation support should conform to the latest OSHA and other applicable agency requirements. Design of all excavation slopes greater than 4 feet in depth and design of sheeting, shoring, and bracing should be performed by a New York State licensed Professional Engineer.

As noted in Sections 6.3 and 7.3, groundwater was not encountered at the time of the investigation, at either site, therefore the need for construction phase dewatering is not anticipated. A dewatering system, if required, should be designed by a professional engineer, licensed in the State of New York.

12.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field-testing support should be engaged by the owner to observe that all earthwork is performed in accordance with the specifications, the Code, and the criteria provided in this report. At a minimum, the following work should be performed under the observation of the geotechnical engineer:

- Subgrade preparation
- Proofrolling
- Remedial removals of unsuitable soils
- Fill placement and compaction
- Placement and compaction of pavement
- Geostabilization fabric installation, if necessary
- Dewatering, if necessary

All materials proposed for use as soil fill should be tested and approved prior to delivery to the site. Additionally, all fill materials should be tested as they are being placed to verify that the required compaction is achieved. We further recommend that any revisions to the project plans and specifications based upon the recommendation presented in this letter be reviewed by Tectonic prior to their implementation. It should be noted that upon review of those documents, some recommendations presented herein may be revised or modified.

13.0 LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report.

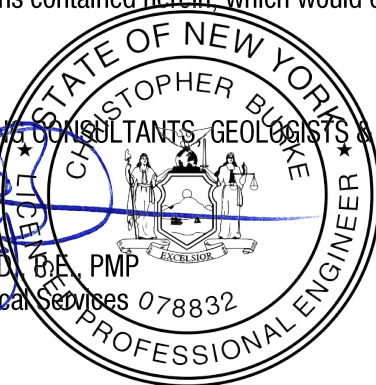
The recommendations contained in this report are intended for design purposes only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil, and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of the Florida Union Free School District and their designees for the proposed site improvements described within this report. We recommend that prior to construction, Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C. (Tectonic) review the project plans and specifications. It should be noted that upon review of those documents, some recommendations presented herein might be revised or modified. In the event that any changes in the design are planned, Tectonic shall not consider the conclusions and recommendations contained in this report valid unless reviewed and verified in writing. It is further recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

Sincerely,

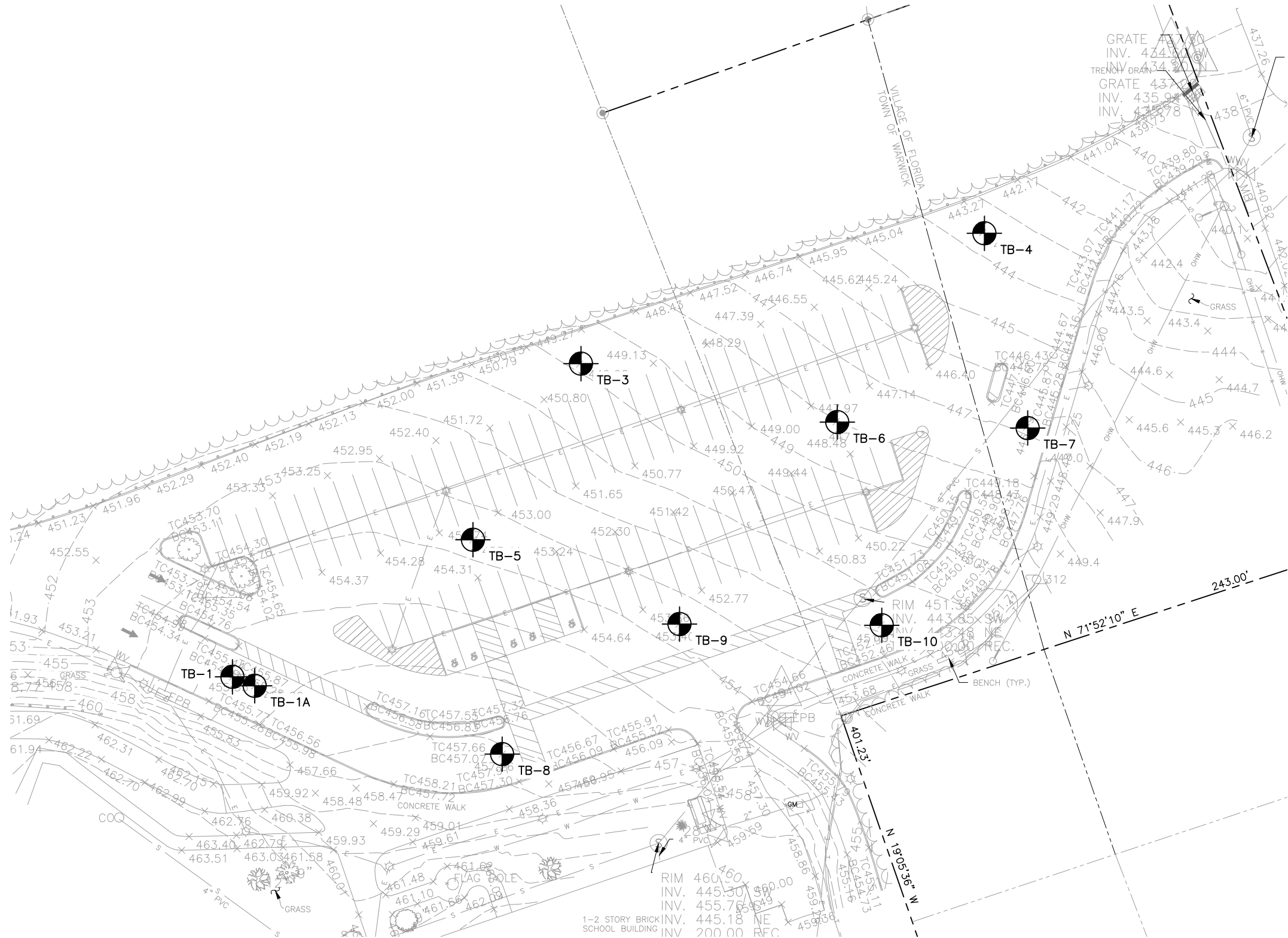
TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS & LAND SURVEYORS, D.P.C.

Christopher Burke, PhD, B.E., PMP
Manager of Geotechnical Services



Attachments: Location Plan
 Boring Logs
 Laboratory Test Results

SC/MAS "G:\Newburgh\Geotechnical\10500\10537.01 Florida UFSD\Report\10537.01 Florida UFSD geo report.docx"



LEGEND

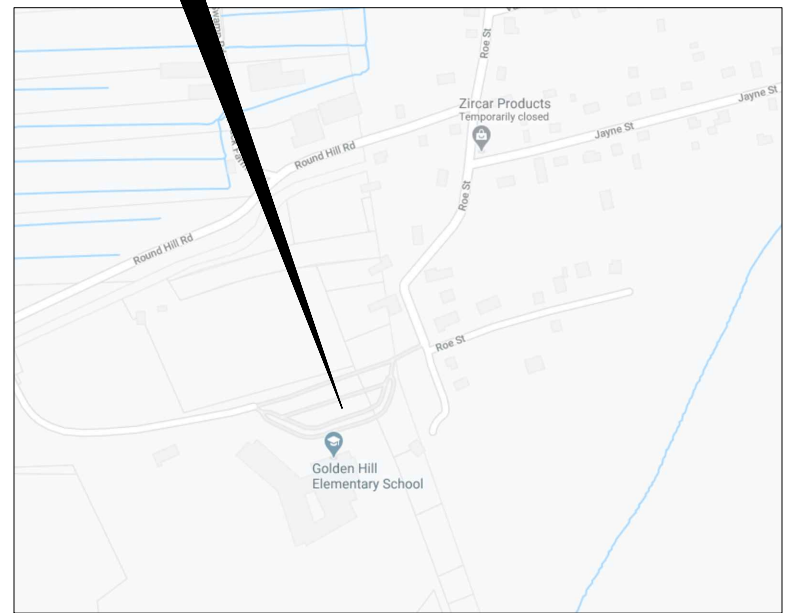


TB-1 APPROXIMATE BORING LOCATION

NOTES

1. PLAN BASED ON A SURVEY BY TECTONIC ENGINEERING, DATED 8/18/2020.
2. BORING LOCATIONS WERE SURVEYED BY TECTONIC AND SHOULD BE CONSIDERED APPROXIMATE.

SITE



Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C.
70 Pleasant Hill Road Phone: (845) 534-5959
P.O. Box 37 (800) 829-6531
Mountainville, NY 10953 www.tectonicengineering.com
Project Contact Info
1279 Route 300
Newburgh, NY 12550 Phone: (845) 567-6656

BORING LOCATION PLAN

GOLDEN HILL ELEMENTARY SCHOOL
478 ROUND HILL ROAD
VILLAGE OF FLORIDA
ORANGE COUNTY, NEW YORK

Date 8/24/2020	Work Order 10537.01	Drawing No. FIGURE 2	Rev 0
Scale 1:50			



Date 8/24/2020	Work Order 10537.01	Drawing No. FIGURE 1	Rev 0
Scale 1:50			

Project Contact Info
1279 Route 300
Newburgh, NY 12550 Phone: (845) 567-6656

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
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ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: ---			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			DEPTH (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				10	20	30	
				LENGTH (IN.)	RQD (%)								
1	24	22 15 9	S-1	14		M	SM	4" Asphalt, 2" Subbase Gy-bwn c-f SAND, little c-f Gravel, and Silt (FILL)					1
2		7											2
3	16	9 7 9	S-2	14		M	SM	Bwn c-f SAND, some c-f Gravel, some c-f Silt (fractured Shale)					3
4	50+	7 50/4	S-3	4		M	GM	Gy-bwn c-f GRAVEL, and c-f Sand, little Silt (Spoon refusal) Auger refusal @ 4.5'					4
5													5
6													6
7													7
8													8
9													9
10													10
11													11
12													12
13													13
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20													20
21													21
22													22
23													23
24													24
25													25

REMARKS:













PROJECT No. **10537.01**
PROJECT: **Florida Union Free School District**
LOCATION: **Florida, NY**

BORING No. TB-1A (GH)


SHEET No. 1 of 1





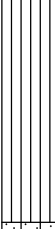



CLIENT: Florida Union Free School District				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath						
CONTRACTOR: Core Down Drilling								DRILLER: Andrew Bellucci						
METHOD OF ADVANCING BORING		DIA.	DEPTH					SURFACE ELEVATION: ---						
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ROT. DRILL:			TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20							
CASING:			TO	WEATHER: Overcast TEMP: 90° F			DATE FINISH: 7/20/20							
DIAMOND CORE:			TO	DEPTH TO ROCK: 6'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		DEPTH (FT.)					
Geoprobe 7822 DT with Automatic Hammer				*CHANGES IN STRATA ARE INFERRED			●							
							1 2 3 4 5							
DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %					
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	X --- ⊗ --- Δ ---				
						10 20 30 40 50								
					●					STANDARD PENETRATION (BLOWS/FT.)				
										10 20 30 40 50				
1							5" Asphalt, 3" Subbase							1
2														2
3														3
4														4
5														5
6							Auger refusal @ 6' on apparent bedrock							6
7							End of Boring at 6'							7
8														8
9														9
10														10
11														11
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25														25
REMARKS:														

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			DEPTH (FT.)																	
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT % X	WATER CONTENT % O	LIQUID LIMIT % Δ																		
				LENGTH (IN.)	RQD (%)																									
1	40	26	S-1	6		M	GP	6" Asphalt, 4" Subbase Gy-bwn c-f GRAVEL, and c-f Sand, trace Silt (FILL)			10	20	30	40	50	1														
2		22																											2	
3	17	18																												3
4		16	S-2	8		M	GM	Gy-bwn c-f GRAVEL, and c-f Sand, little Silt (FILL)			10	20	30	40	50		4													
5	11	14																											5	
6		8																												6
7		9	S-3	6		M	GP	Gy c-f GRAVEL, some c-f Sand, trace Silt			10	20	30	40	50		7													
8		12																											8	
9		6																												9
10		6	S-4	4		M	GP	Gy c-f GRAVEL, little Sand, trace Silt (fractured Shale)			10	20	30	40	50		10													
11	6	5																												11
12		3																												12
13	50+	4	S-5	4		M	GM	Gy f GRAVEL, and Silt, little c-f Sand (spoon refusal) Auger refusal @ 12.5'			10	20	30	40	50		13													
14		50/1																												14
15																														15
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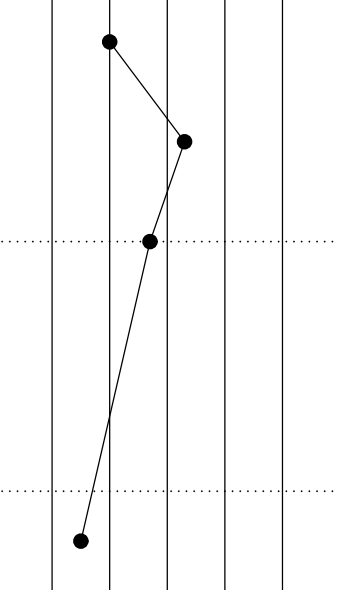

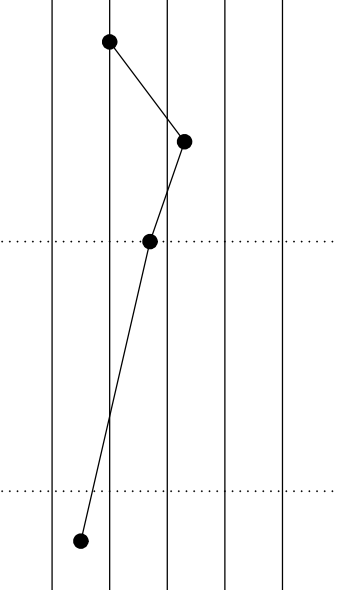

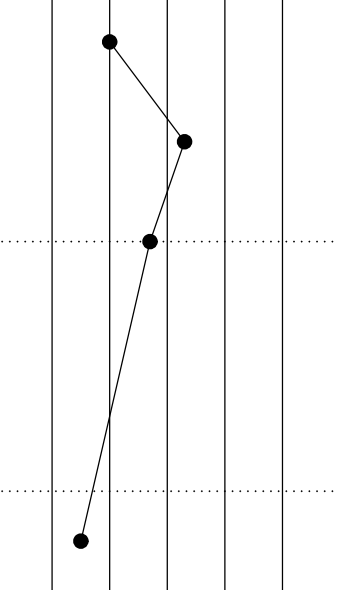

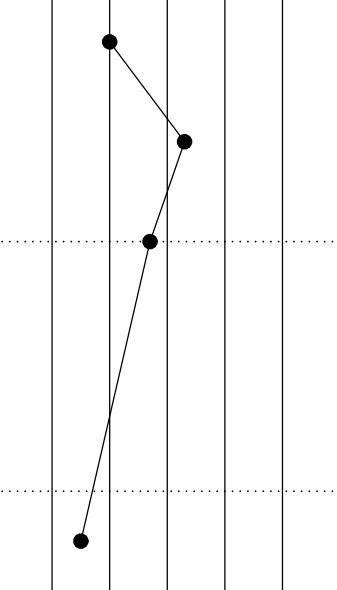
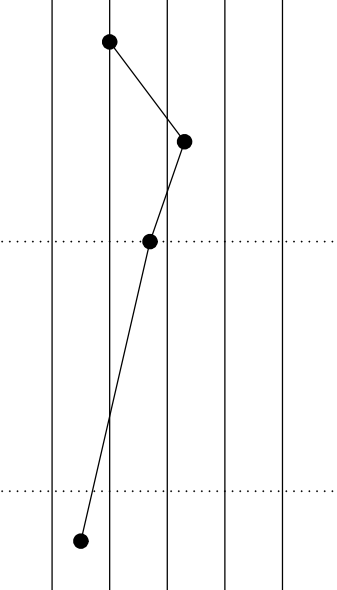
REMARKS:

CLIENT: Florida Union Free School District				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath				
CONTRACTOR: Core Down Drilling								DRILLER: Andrew Bellucci				
METHOD OF ADVANCING BORING		DIA.	DEPTH					SURFACE ELEVATION: ---				
POWER AUGER:		2 1/4"	0		TO	10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:				TO		SCREEN DEPTH: --- TO ---		DATE START: 7/20/20				
CASING:				TO		WEATHER: Overcast TEMP: 85° F		DATE FINISH: 7/20/20				
DIAMOND CORE:				TO		DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH ● (TONS/FT)				
Geoprobe 7822 DT with Automatic Hammer				*CHANGES IN STRATA ARE INFERRED			1	2	3	4		5

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT)												
			SAMPLE NUMBER	RECOV.		MOISTURE				X	O	A	X	O	A																
				LENGTH (IN.)	RQD (%)											10	20	30		40	50										
										STANDARD PENETRATION (BLOWS/FT.)																					
											10	20	30	40	50																
1	31	25	S-1	16		M	SP	5" Asphalt, 2" Subbase Bwn-gy c-f SAND, and c-f Gravel, trace Silt (FILL)										1													
2		13																	18	19											
3	33	28	S-2	6		M	GP												Gy c-f GRAVEL, and c-f Sand, trace Silt (FILL)										3		
4		15																												6	
5	11	3	S-3	8		M	ML	Gy-lgt bwn SILT, and c-f Gravel, little c-f Sand, trace organics (roots)										5													
6		4																												7	5
7																			Lgt bwn c-f SAND, some f Gravel, some Silt (fractured shale present)										11		
8																															
9																															
10																															
11	21	12	S-4	14		M	SM	End of Boring at 12'											12												
12		8																		13	11										
13																															13
14																															14
15																			15												
16																			16												
17																			17												
18																			18												
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23																			23												
24																			24												
25																			25												


REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 90° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT)											
			SAMPLE NUMBER	RECOV.		MOISTURE				X	20	30	40	50	X	20	30	40		50										
				LENGTH (IN.)	RQD (%)																10	20	30	40	50					
											STANDARD PENETRATION (BLOWS/FT.)																			
											10 20 30 40 50																			
1	20	16	S-1	14		M	SP	4" Asphalt, 2" Subbase Gy-bwn c-f SAND, and c-f Gravel, trace Silt (FILL)			1																			
2		8										2																		
3	33	14	S-2	8		M	SP	Same (FILL)			3																			
4		19										4																		
5	27	16	S-3	12		M	GM	Gy-blk c-f GRAVEL, and c-f Sand, little Silt			5																			
6		11										6																		
7											7																			
8											8																			
9											9																			
10											10																			
11	15	2	S-4	10		M	GM	Lgt bwn-gy c-f GRAVEL, some Silt, some c-f Sand (fractured Shale)			11																			
12		4										12																		
13		11						End of Boring at 12'			13																			
14		8									14																			
15											15																			
16											16																			
17											17																			
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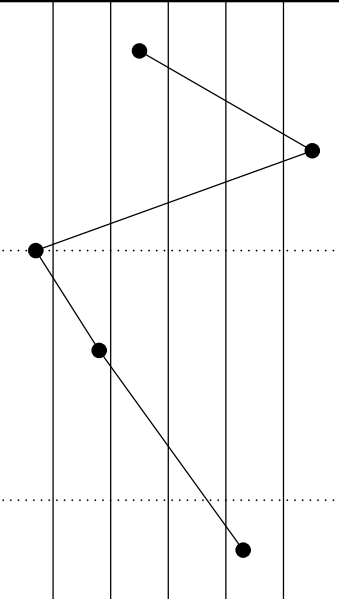

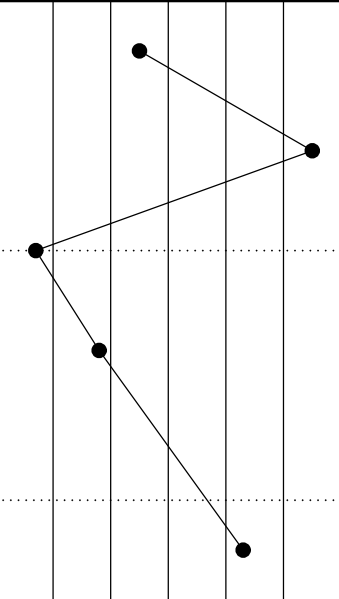
REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %			DEPTH (FT)	
			SAMPLE NUMBER	RECOV.		MOISTURE				✕	⊗	△		
				LENGTH (IN.)	RQD (%)					10	20	30		40
STANDARD PENETRATION (BLOWS/FT.)														
1	30	35	S-1	12		M	SM	4" Asphalt, 2" Subbase						1
2		14						Gy c-f SAND, and c-f Gravel, little Silt (FILL)						2
3	15	16	S-2	16		M	ML	Lgt bwn-gy SILT, little c-f Gravel, little c-f Sand						3
4		7												4
5	50+	8	S-3	5		M	SM	Lgt bwn-gy c-f SAND, and c-f Gravel, little Silt (spoon refusal)						5
6		12												6
7		50/5												7
8														8
9														9
10														10
11														11
12														12
13														13
14														14
15														15
16														16
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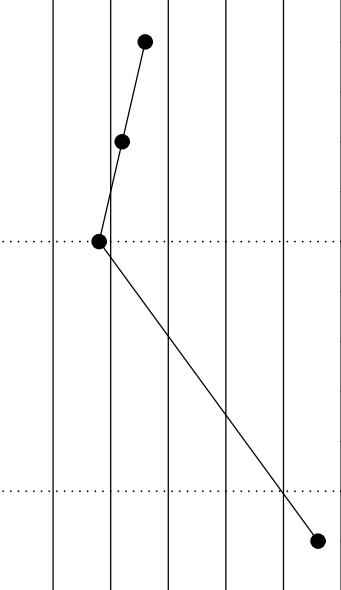



REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 10'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/20/20			
CASING:		TO	WEATHER: Overcast TEMP: 90° F		DATE FINISH: 7/20/20			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 			
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			DEPTH (FT.)		
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %			
				LENGTH (IN.)	RQD (%)										
1	25	26	S-1	18		M	GM	4' Asphalt, 2" Subbase Gy-lgt bwn c-f GRAVEL, and c-f Sand, little Silt (FILL)			1				
2		12													2
3	55	24									S-2	8		M	SP
4		33					4								
5	7	22	S-3	8		M	GM								
6		9													6
7	18	4									S-4	10		M	SM
8		3					8								
9		4					9								
10		8											10		
11	43	9	S-5	6		M	GP				Gy c-f GRAVEL, and c-f Sand, trace Silt (fractured Shale)			11	
12		9													
13		9													13
14										14					
15		44								15					
16		31								16					
17		12								17					
18		15								18					
19										19					
20										20					
21										21					
22										22					
23										23					
24										24					
25										25					









REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 90° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 11.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %			DEPTH (FT)	
			SAMPLE NUMBER	RECOV.		MOISTURE				STANDARD PENETRATION (BLOWS/FT.)				
				LENGTH (IN.)	RQD (%)					10	20	30		40
1	26	24	S-1	8		M	SP	4" Asphalt, 2" Subbase Gy-blk c-f SAND, and c-f Gravel, trace Silt (FILL)			1			
2		14												
3	22	19	S-2	12		M	GM				Gy-bwn c-f GRAVEL, some c-f Sand, some Silt (FILL)			3
4		6												
5	18	9	S-3	4		M	GP	Gy c-f GRAVEL, and c-f Sand, trace Silt						5
6		5												
7		6									7			
8		12									8			
9		15						9						
10								10						
11	56+	5	S-4	10		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (fractured shale) (spoon refusal)			11			
12		6												
13		50/5									13			
14											14			
15								15						
16								16						
17								17						
18								18						
19								19						
20								20						
21								21						
22								22						
23								23						
24								24						
25								25						

REMARKS:

CLIENT: Florida Union Free School District				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath			
CONTRACTOR: Core Down Drilling								DRILLER: Andrew Bellucci			
METHOD OF ADVANCING BORING		DIA.	DEPTH					SURFACE ELEVATION: ---			
POWER AUGER:		2 1/4"	0 TO 10'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks			
ROT. DRILL:			TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20				
CASING:			TO	WEATHER: Overcast TEMP: 90° F			DATE FINISH: 7/20/20				
DIAMOND CORE:			TO	DEPTH TO ROCK: 10.5'			UNCONFINED COMPRESS. STRENGTH ● (TONS/FT)			1 2 3 4 5	
Geoprobe 7822 DT with Automatic Hammer				*CHANGES IN STRATA ARE INFERRED							


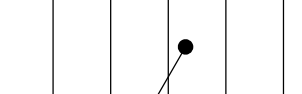

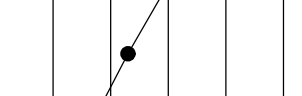

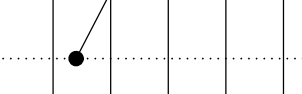
DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			DEPTH (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE							
				LENGTH (IN.)	RQD (%)								
1	37	25	S-1	8		M	SM	4" Asphalt, 3" Subbase Gy-bwn c-f SAND, and c-f Gravel, little Silt (FILL)				1	
2		20											17
3	18	9	S-2	8		M	SM	Lgt bwn c-f SAND, some c-f Gravel, some Silt				3	
4		7											11
5	29	8	S-3	18		M	SM	Lgt bwn c-f SAND, some c-f Gravel, some Silt				5	
6		11											18
7													7
8													8
9													9
10	50+	50/5	S-4	5		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (fractured Shale)				10	
11													11
12								End of Boring at 10.5'					12
13													13
14													14
15													15
16													16
17													17
18													18
19													19
20													20
21													21
22													22
23													23
24													24
25													25

Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (fractured Shale)

End of Boring at 10.5'



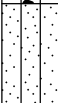
REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 9.5'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 9.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT)
			SAMPLE NUMBER	RECOV.		MOISTURE				X	10	20	30	X	40	50	△		
				LENGTH (IN.)	RQD (%)													STANDARD PENETRATION (BLOWS/FT.)	
1	33	19	S-1	18		M	GM	2" Asphalt, 3" Subbase Gy-bwn c-f GRAVEL, and c-f Sand, trace Silt (FILL)			1								
2		16										2							
3	23	11	S-2	10		M	SM	Gy-bwn c-f SAND, some c-f Gravel, some Silt			3								
4		13										4							
5	14	8	S-3	18		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (fractured Shale)			5								
6		8										6							
7		8									7								
8		6									8								
9		8						Auger refusal at 9.5'			9								
10								End of Boring at 9.5'			10								
11											11								
12											12								
13											13								
14											14								
15											15								
16											16								
17											17								
18											18								
19											19								
20											20								
21											21								
22											22								
23											23								
24											24								
25											25								




REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 6.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/20/20		
CASING:		TO	WEATHER: Overcast TEMP: 90° F			DATE FINISH: 7/20/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 6.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT.)			
			SAMPLE NUMBER	RECOV.		MOISTURE				X	-	-	-	X	-	-	-	X		-	-	-
				LENGTH (IN.)	RQD (%)																	
1	30	23	S-1	16		M	GM	3" Asphalt, 2" Subbase Bwn-gy c-f GRAVEL, some c-f Sand, some Silt (FILL)		10	20	30	40	50				1				
2		17																				
3	11	4	S-2	6		M	GM	Bwn-gy c-f GRAVEL, some Silt, some c-f Sand		10	20	30	40	50				2				
4		6																				
5	32	9	S-3	10		M	SM	Gy c-f SAND, and c-f Gravel, little Silt (fractured Shale present)		10	20	30	40	50				3				
6		16																				
7		16						Auger refusal @ 6.5'										4				
8		32																5				
9																		6				
10																		7				
11																		8				
12																		9				
13																		10				
14																		11				
15																		12				
16																		13				
17																		14				
18																		15				
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21																		18				
22																		19				
23																		20				
24																		21				
25																		22				

REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 12'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20		
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 7'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		


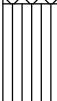


DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	DEPTH (FT)			
			SAMPLE NUMBER	RECOV.		MOISTURE				×	⊗	△				
				LENGTH (IN.)	RQD (%)					10	20	30		40	50	
											STANDARD PENETRATION (BLOWS/FT.)					
											10	20	30	40	50	
1	26	32	S-1	18		D	GP	3" Asphalt Bwn-gy GRAVEL, and c-f Sand, trace Silt (FILL)							1	
2		11														2
3	13	15	S-2	16		M	CL	Bwn SILT & CLAY, little c-f Gravel							3	
4		12														4
5	4	7	S-3	14		M	CL	Same							5	
6		6														6
7		3						Auger refusal @ 7'						7		
8		2						End of Boring at 7'						8		
9		2													9	
10		1													10	
11															11	
12															12	
13															13	
14															14	
15															15	
16															16	
17															17	
18															18	
19															19	
20															20	
21															21	
22															22	
23															23	
24															24	
25															25	

REMARKS:

CLIENT: Florida Union Free School District				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa				
CONTRACTOR: Core Down Drilling								DRILLER: Andrew Bellucci				
METHOD OF ADVANCING BORING		DIA.	DEPTH					SURFACE ELEVATION: ---				
POWER AUGER:		2 1/4"	0 TO 12'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks					
ROT. DRILL:			TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20					
CASING:			TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20					
DIAMOND CORE:			TO	DEPTH TO ROCK: 6'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 					
Geoprobe 7822 DT with Automatic Hammer				*CHANGES IN STRATA ARE INFERRED								
DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			DEPTH (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	9	39	S-1	12		M	ML				1	
2		6										2
3	4	2	S-2	24		M	CL					3
4		2									4	
5	3	2	S-3	23		M	CL	Same Auger refusal at 6.1'			5	
6		1									6	
7		2						End of Boring at 6.1'			7	
8											8	
9											9	
10											10	
11											11	
12											12	
13											13	
14											14	
15											15	
16											16	
17											17	
18											18	
19											19	
20											20	
21											21	
22											22	
23											23	
24											24	
25											25	


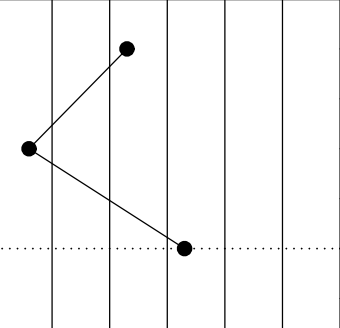


REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa		
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci		
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---		
POWER AUGER:	2 1/4"	0 TO 12'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20			
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20			
DIAMOND CORE:		TO	DEPTH TO ROCK: 6.8'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)			
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5			


DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	DEPTH (FT)		
			SAMPLE NUMBER	RECOV.		MOISTURE				X	O	A			
				LENGTH (IN.)	RQD (%)					10	20	30		40	50
STANDARD PENETRATION (BLOWS/FT.)															
										10	20	30	40	50	
1	22	38	S-1	17		D	SM	3.5" Asphalt, 1" Subbase Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL)							1
2		15													
3	8	7	S-2	16		M	ML	Bwn SILT, some c-f Gravel, trace Sand							3
4		9													
5	0	2	S-3	7		M	SM	Bwn SAND, little m-f Gravel, little Silt							5
6		WOH													
7		WOH	S-4	10		M	GP	Bwn-gy GRAVEL, trace Sand Refusal @ 6' 8"							7
		36													
8		50													8
9								End of Boring at 6.8'							9
10															10
11															11
12															12
13															13
14															14
15															15
16															16
17															17
18															18
19															19
20															20
21															21
22															22
23															23
24															24
25															25

REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 12'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20		
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 6.6'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT.)												
			SAMPLE NUMBER	RECOV.		MOISTURE				X	-	-	X	-	-	X	-	-		X											
				LENGTH (IN.)	RQD (%)																10	20	30	40	50						
										STANDARD PENETRATION (BLOWS/FT.)																					
1	23	28	S-1	8		D	SM	2" Asphalt, 3" subbase Bwn-gy c-f SAND, and c-f Gravel, little Clayey Silt (FILL)											1												
2	5																														
3	6	4	S-2	22		M	ML													Bwn CLAYEY SILT, little c-f Gravel											3
4	3																														
5	33	24	S-3	2		M	GP	Bwn-gy c-f GRAVEL, little f Sand, trace Silt											5												
6	50																														
7																				Auger refusal at 6' 6"											7
8																				End of Boring at 6.6'											8
9																			9												
10																			10												
11																			11												
12																			12												
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REMARKS:

CLIENT: Florida Union Free School District				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa			
CONTRACTOR: Core Down Drilling								DRILLER: Andrew Bellucci			
METHOD OF ADVANCING BORING		DIA.	DEPTH					SURFACE ELEVATION: ---			
POWER AUGER:		2 1/4"	0 TO 12'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks			
ROT. DRILL:			TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20				
CASING:			TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20				
DIAMOND CORE:			TO	DEPTH TO ROCK: 10.3'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
Geoprobe 7822 DT with Automatic Hammer				*CHANGES IN STRATA ARE INFERRED			1	2	3		4

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			DEPTH (FT.)	
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT % X-----◇-----△ 10 20 30 40 50	WATER CONTENT %	LIQUID LIMIT %		
				LENGTH (IN.)	RQD (%)									
1	35	24	S-1	16		D	GM	1.5" Asphalt, 2" subbase Bwn-gy c-f GRAVEL, and c-f Sand, trace Silt (FILL)					1	
2		17												2
3	16	8		S-2	21		M	ML	Bwn SILT, little c-f Gravel, trace Sand					3
4		7												4
5	9	9	S-3		16		M	ML	Same					5
6		13												6
7	7	16		S-4	15		M	ML	Bwn SILT, little c-f Gravel, trace Sand					7
8		8												8
9		1												9
10		1	S-5	0				No Recovery (Sampler refusal)					10	
11		2												11
12		3												12
13		4											13	
14		4											14	
15													15	
16													16	
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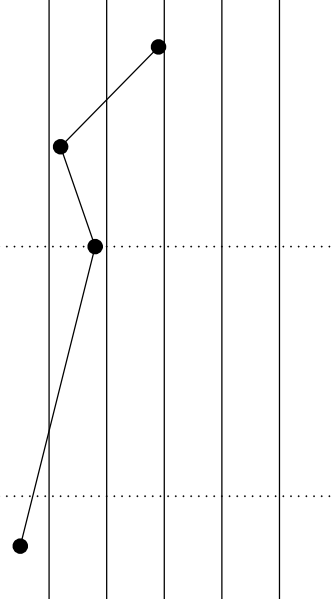
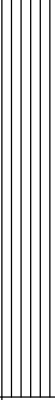

REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Liam McGrath	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 12'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/21/20			
CASING:		TO	WEATHER: Clear TEMP: 90° F		DATE FINISH: 7/21/20			
DIAMOND CORE:		TO	DEPTH TO ROCK: 9.5'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 			
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			DEPTH (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	
				LENGTH (IN.)	RQD (%)								
1	24	38	S-1	12		M	GP	3.5" Asphalt, 5" Subbase Bwn Sandy GRAVEL, trace Clay (FILL)					1
2		15											2
3	9	4	S-2	14		M	ML	Bwn SILT & CLAY, little Gravel					3
4		3											4
5	9	4	S-3	1		D	ML	Dk bwn SILT					5
6		5											6
7		7											7
8													8
9													9
10		10											10
11		5											11
12		4											12
13		7											13
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22													22
23													23
24													24
25													25

REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 12'		MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20		
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: ---			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			DEPTH (FT)	
			SAMPLE NUMBER	RECOV.		MOISTURE				X	20	30	40	50	X	20	30	40		50
				LENGTH (IN.)	RQD (%)															
1	29	31	S-1	17		D	GM	3" Asphalt, 1" Subbase Bwn-gy c-f GRAVEL, and c-f Sand, little Silt (FILL)			1									
2		18																		
3	12	9	S-2	2		M	GM					3								
4		6																		
5	18	11	S-3	20		M	ML	Bwn CLAYEY SILT, some c-f Gravel, trace f Sand		5										
6		7																		
7		6									6									
8											7									
9								8												
10								9												
11	5	2	S-4	18		M	ML	Bwn CLAYEY SILT, some c-f Gravel		11										
12		2																		
13		3									10									
14		4									11									
15								12												
16								13												
17								14												
18								15												
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21								18												
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23								20												
24								21												
25								22												
								23												
								24												
								25												

REMARKS:

CLIENT: Florida Union Free School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Ryan Villa	
CONTRACTOR: Core Down Drilling							DRILLER: Andrew Bellucci	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: ---	
POWER AUGER:	2 1/4"	0 TO 12'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/21/20		
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/21/20		
DIAMOND CORE:		TO	DEPTH TO ROCK: 11.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
Geoprobe 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- A --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	DEPTH (FT)			
			SAMPLE NUMBER	RECOV.		MOISTURE				×	⊗	△				
				LENGTH (IN.)	RQD (%)					10	20	30		40	50	
											STANDARD PENETRATION (BLOWS/FT.)					
											10	20	30	40	50	
1	27	23	S-1	8		M	ML	2.5" Asphalt, 3" Subbase Bwn SILTY CLAY					1			
2		14														
3	15	6	S-2	12		M	ML	Bwn CLAYEY SILT, Gravel mix					2			
4		7														
5	41	8	S-3	12		D	ML	Same					3			
6		13														
7		15	S-4	18		M	ML	Same, trace Gravel					4			
8		19														
9		22											5			
10		22														
11	39	15						End of Boring at 11.5'					6			
12		22														
13		17											7			
14		50														
15													8			
16																
17													9			
18																
19													10			
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													25			

REMARKS:

LEGEND FOR SOIL DESCRIPTION

<u>COARSE GRAINED SOIL</u> (Coarser than No. 200 Sieve)							
<u>DESCRIPTIVE TERM & GRAIN SIZE</u>							
<u>TERM</u>		<u>SAND</u>			<u>GRAVEL</u>		
coarse - c		No.	4	Sieve to No.	10	Sieve	3" to 3/4"
medium - m		No.	10	Sieve to No.	40	Sieve	3/4" to 3/16"
fine - f		No.	40	Sieve to No.	200	Sieve	
<u>COBBLES</u>		3" to 10"			<u>BOULDERS</u>		10" +
<u>GRADATION DESIGNATIONS</u>				<u>PROPORTIONS OF COMPONENT</u>			
fine, f				Less than 10% coarse to medium			
medium to fine, m-f				Less than 10% coarse			
medium, m				Less than 10% coarse and fine			
coarse to medium, c-m				Less than 10% fine			
coarse, c				Less than 10% medium and fine			
coarse to fine, c-f				All greater than 10%			

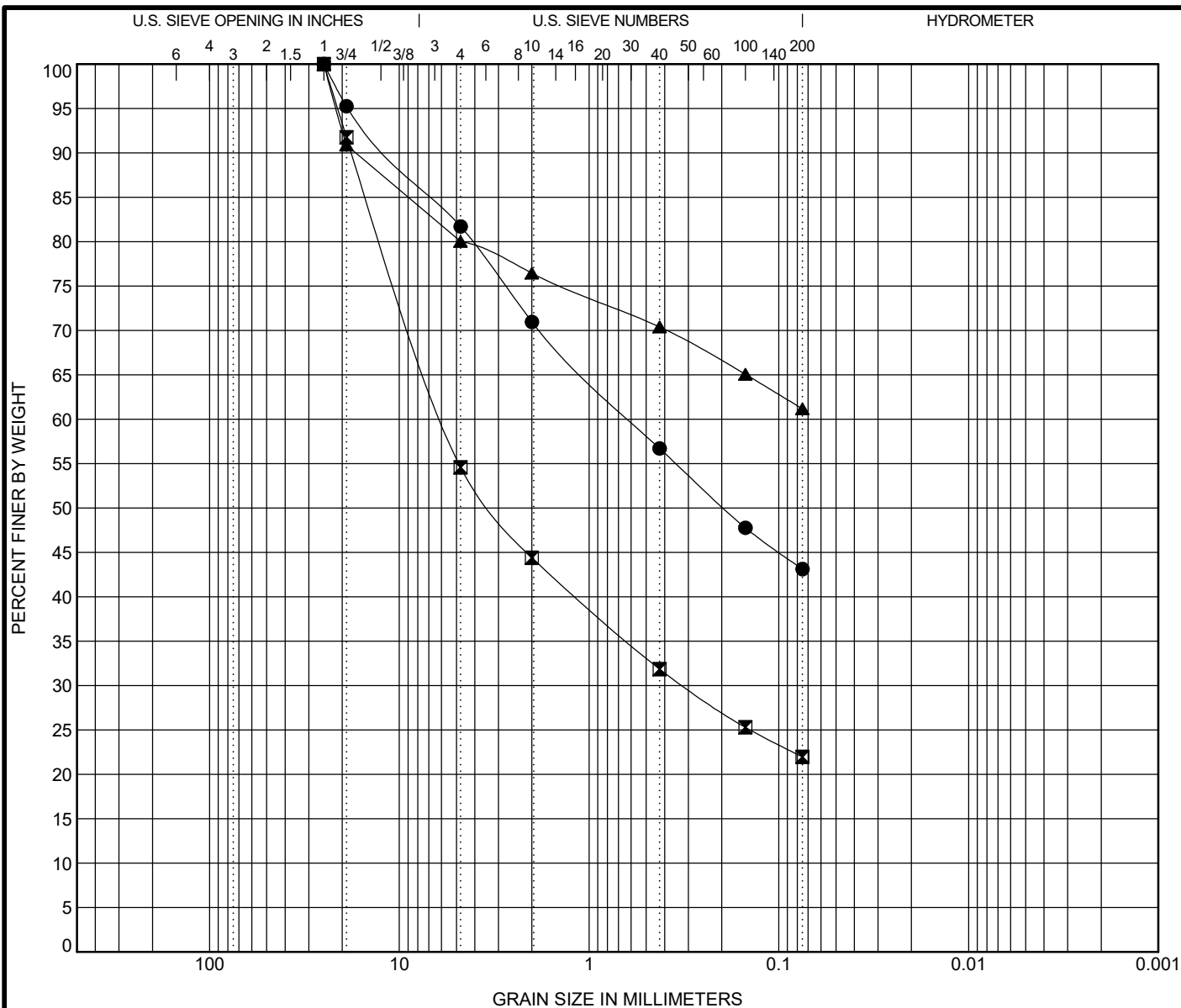
<u>FINE GRAINED SOIL</u> (Finer than No. 200 Sieve)		
<u>DESCRIPTION</u>	<u>PLASTICITY INDEX</u>	<u>PLASTICITY</u>
Silt	0 - 1	none
Clayey Silt	2 - 5	slight
Silt & Clay	6 - 10	low
Clay & Silt	11 - 20	medium
Silty Clay	21 - 40	high
Clay	greater than 40	very high

<u>PROPORTION</u>	
<u>DESCRIPTIVE TERM</u>	<u>PERCENT OF SAMPLE WEIGHT</u>
trace	1 - 10
little	10 - 20
some	20 - 35
and	35 - 50
The primary component is fully capitalized	

<u>COLOR</u>		
Blue - blue	Gy - gray	Wh - white
Blk - black	Or - orange	Yl - yellow
Bwn - brown	Rd - red	Lgt - light
Gn - green	Tn - tan	Dk - dark

<u>SAMPLE NOTATION</u>	
S - Split Spoon Soil Sample	WOC - Weight of Casing
U - Undisturbed Tube Sample	WOR - Weight of Rods
C - Core Sample	WOH - Weight of Hammer
B - Bulk Soil Sample	PPR - Compressive Strength based on Pocket Penetrometer
NR - No Recovery of Sample	TV - Shear Strength (tsf) based on Torvane

<u>ADDITIONAL CLASSIFICATIONS</u>	
New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See sections 1804.2 of the 2008 Building Code for further details.	



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification				Classification						WC%	LL	PL	PI	Cc	Cu
●	TB-1	0.0	S-1	Gy-bwn SAND, and c-f Silt, little c-f Gravel						10.2					
☒	TB-10	0.0	S-1	Bwn-Gy c-f Gravel, some c-f Sand, some Silt						6.3					
▲	TB-5	2.0	S-2	Lgt Bwn-Gy SILT, little c-f Gravel, little c-f Sand						12.7					
Sample Identification				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material			
●	TB-1	0.0	S-1	25	0.608			18.3	38.6	43.1		Boring			
☒	TB-10	0.0	S-1	25	5.815	0.317		45.4	32.6	22.0		Boring			
▲	TB-5	2.0	S-2	25				20.0	18.9	61.2		Boring			

Tectonic

280 Little Britain Road Bldg 2
Newburgh, NY 12550
Telephone: 845.563.9081

Fax: 845.563.9085

GRAIN SIZE DISTRIBUTION

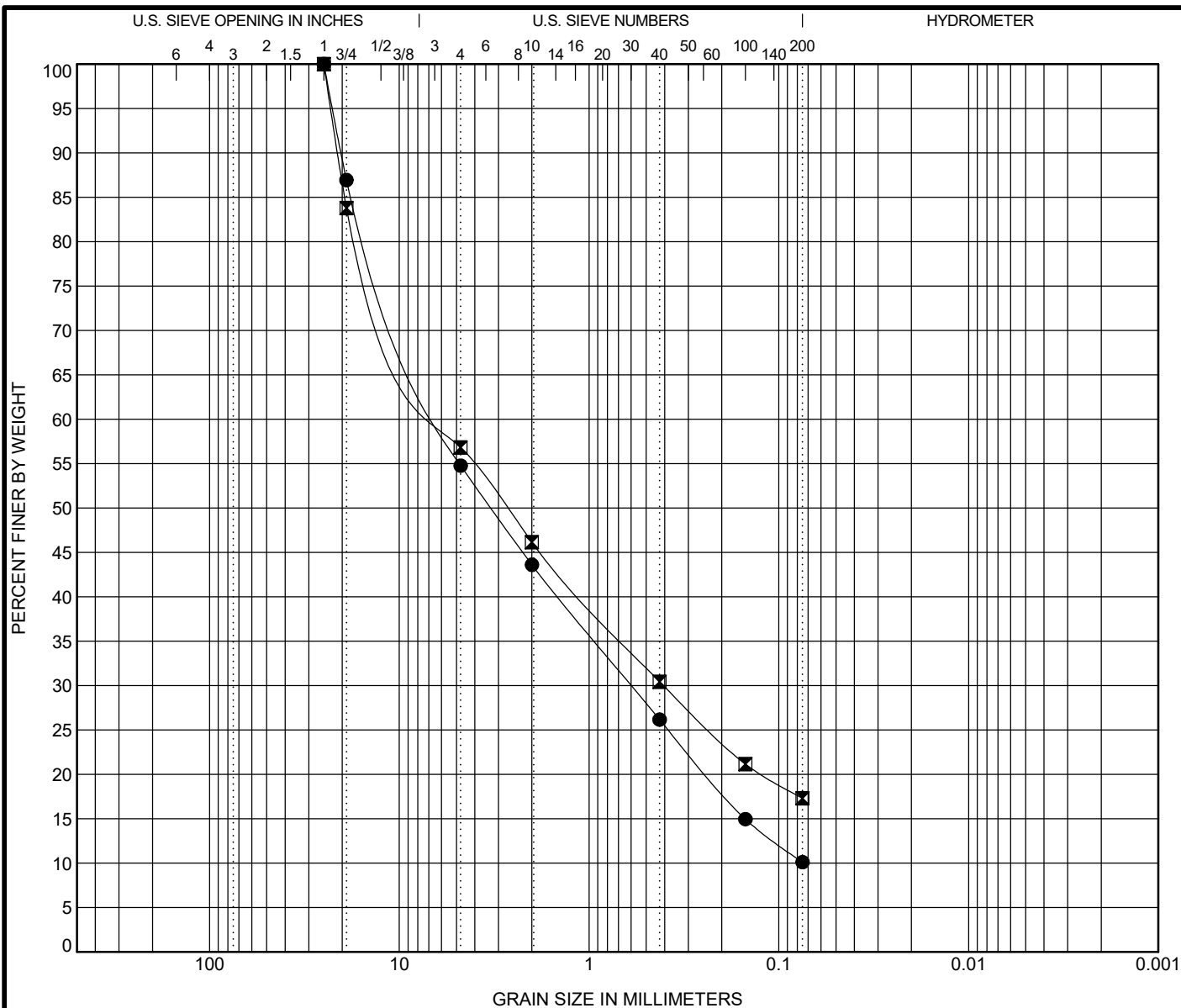
Project No: 10537.01

Date: 8/12/20

Project: Florida UFSD: Golden Hills E.S.

Location: Florida, NY

GRAIN SIZE DISTRIBUTION 10537.GOLDEN.GPJ TECTONIC ENG.GDT 8/12/20



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification				Classification				WC%	LL	PL	PI	Cc	Cu
●	TB-5	0.0	S-1	Bwn-Gy c-f Gravel, and c-f Sand, trace Silt				3.5				0.81	80.58
☒	TB-7	0.0	S-1	Bwn-Gy c-f Gravel, and c-f Sand, little Silt				7.0					

Sample Identification				D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material	
●	TB-5	0.0	S-1	25	5.95	0.598		45.2	44.7	10.1		Boring	
☒	TB-7	0.0	S-1	25	5.594	0.405		43.2	39.5	17.3		Boring	

Tectonic

280 Little Britain Road, Bldg. 2
Newburgh, NY 12550
Telephone: (845) 563-9081

Fax: (845) 563-9085

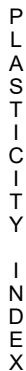
GRAIN SIZE DISTRIBUTION

Project No: 10537.01

Date: 8/7/20

Project: Florida UFSD: SS Seward Institute

Location: Florida, NY



●	TB-2	2.0	S-2	23	14	9	NA	15.6	Bwn SILT & CLAY
---	------	-----	-----	----	----	---	----	------	-----------------

Tectonic

Fax: (845) 563-9085

Location: **Florida, NY**

FLORIDA UNION FREE SCHOOL DISTRICT**BID PROPOSAL FORM**

NAME OF BIDDER: _____

BUSINESS ADDRESS: _____

TELEPHONE NUMBER: _____ DATE OF BID: _____

The bidder mentioned above declares and certifies:

First: That said bidder is of lawful age and the only one interested in this bid, and that no one other than said bidder has any interest herein.

Second: That this bid is made without any previous understanding, agreement, or connection with any other person, firm, or corporation making a bid for the same purpose, and is in all respects fair and without collusion or fraud.

Third: That no member of the Board of Education of the **Florida Union Free School District**, Village of Florida, New York, nor any officer or employee or person whose salary is payable as a whole or in part from the treasury of said Board of Education is directly or indirectly interested in this bid or in the supplies, materials, equipment, work, or services to which it relates, or in any portion of the profits thereof.

Fourth: That said bidder has carefully examined the Instruction to Bidders, schedules, and specifications prepared under the direction of the Board of Education, and will, if successful in this bid, furnish and deliver at the prices bid and within the time stated, all materials, supplies, apparatus, goods, wares, merchandise, services, or labor for which this bid is made.

Fifth: ~~Single Prime Contracts: Where the project cost does not exceed \$1,500,000 and the Owner has decided to solicit bids from one general contractor, the Bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work in the contract, and the agreed-upon amount to be paid to each, for: (A) Plumbing and gas fitting; (B) Steam heating, hot water heating, ventilating and air condition apparatus and (C) Electric wiring and standard illuminating fixtures.~~

~~After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed upon amount to be paid to each shall require the approval of the public owner, upon a showing presented to the public owner of legitimate construction need for such change, which shall be open to public inspection.~~

FLORIDA UNION FREE SCHOOL DISTRICT**BID PROPOSAL FORM**

Sixth: That the prices quoted are exclusive of all federal, state, and municipal sales and excise taxes.

Seventh: The undersigned further declares that he has received and examined the following addenda:

Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____

FOR PROPOSAL FORM TO BE VALID, ALL PAGES OF THE PROPOSAL FORM MUST BE DULY EXECUTED.

Eighth: The Bidder shall check here _____ if the bid has been based upon equivalents in lieu of any kind, type, brand, or manufacturer of material other than those named in the specifications. If checked, the Bidder shall submit the Equivalency Form in accordance with Instructions to Bidders, Paragraph 8B. This item in no way prohibits the Bidder from submitting equivalents after the award of contract.

Ninth: The undersigned further understands and agrees that he is to furnish all labor, materials, equipment, supplies, and other facilities and things necessary and required for the execution and completion of:

**Capital Improvements at Golden Hill E.S., SS Seward Institute
and SS Seward Memorial (Bond Phase II)**

in strict accordance with the contract documents:

BASE BID SC 1 - Site Construction

The contractor shall state the complete price to perform all work, including but not limited to, **demolition and site construction for parking lot reconstruction at Golden Hill E.S. and S.S. Seward Institute** as indicated on drawings and specified here in.

Base Bid Price (Golden Hill): \$ _____

Base Bid Price (SS Seward Inst): \$ _____

Site Construction Allowance: \$ 20,000.00

Total Base Bid SC-1 Price: \$ _____

Total bid price written in words

Alternates to BASE BID SC-1 - Site Construction**Alternate No. 1 to Base Bid SC-1**

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and site construction for guardrail replacement at Golden Hill E.S.**, as indicated on drawings and specified herein.

ADD: _____

Bid price written in words

\$ _____

Bid price in dollars and cents

Alternate No. 2 to Base Bid SC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and site construction for entrance drive replacement at Golden Hill E.S.**, as indicated on drawings and specified herein.

ADD: _____

Bid price written in words

\$ _____

Bid price in dollars and cents

Alternate No. 3 to Base Bid SC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **additional asphalt paving material at S.S. Seward Institute**, as indicated on drawings and specified herein.

ADD: _____

Bid price written in words

\$ _____

Bid price in dollars and cents

Alternate No. 4 to Base Bid SC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and site construction for additional sidewalk replacement at S.S. Seward Institute**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

BASE BID GC 1 - General Construction

The contractor shall state the complete price to perform all work, including but not limited to, **abatement, demolition and general construction (excludes food service equipment) at Golden Hill E.S. and S.S. Seward Institute**, as indicated on drawings and specified here in.

Base Bid Price (Golden Hill): \$ _____

Base Bid Price (SS Seward Inst): \$ _____

General Construction Allowance: \$ 20,000.00

Total Base Bid GC-1 Price: \$ _____

Total bid price written in words

Alternates to BASE BID GC-1 - General Construction**Alternate No. 1a to Base Bid GC-1**

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for flooring replacement (all carpet) at Golden Hill E.S.**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 1b to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for flooring replacement (LVT at Main Office A52, Counselor A54, Office C36 and Conference A53/Carpet at Library C39 and Computer Rm 14) at Golden Hill E.S.,** as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 2 to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for Gymnasium wall and ceiling painting at Golden Hill E.S.,** as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 3a to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for flooring replacement (all carpet) at S.S. Seward Institute** as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 3b to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for flooring replacement (LVT at Waiting 05, Reception 04, Conference 06, Closet, Principals 01 and 02/Carpet at Band Rm 150, Band Office 150B and Practice Rms. 150A, 150B and 150c) at S.S. Seward Institute** as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 4 to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for Lobby and Cafeteria ceiling replacement at S.S. Seward Institute**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 5 to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for CMU repair and Soffit replacement at S.S. Seward Memorial**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 6 to Base Bid GC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and general construction for plaza tuckpointing and repairs at S.S. Seward Memorial**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

BASE BID MC 1 - Mechanical Construction

The contractor shall state the complete price to perform all work, including but not limited to, **demolition and mechanical construction at Golden Hill E.S. and S.S. Seward Institute**, as indicated on drawings and specified here in.

Base Bid Price (Golden Hill): \$ _____

Base Bid Price (SS Seward Inst): \$ _____

Mechanical Construction Allowance: \$ 10,000.00

Total Base Bid MC-1 Price: \$ _____

Total bid price written in words

BASE BID PC 1 - Plumbing Construction

The contractor shall state the complete price to perform all work, including but not limited to, **demolition and plumbing construction at Golden Hill E.S. and S.S. Seward Institute**, as indicated on drawings and specified here in.

Base Bid Price (Golden Hill): \$ _____

Base Bid Price (SS Seward Inst): \$ _____

Plumbing Construction Allowance: \$ 10,000.00

Total Base Bid PC-1 Price: \$ _____

Total bid price written in words

BASE BID EC 1 - Electrical Construction

The contractor shall state the complete price to perform all work, including but not limited to, **demolition and electrical construction at Golden Hill E.S. and S.S. Seward Institute**, as indicated on drawings and specified here in.

Base Bid Price (Golden Hill): \$ _____

Base Bid Price (SS Seward Inst): \$ _____

Electrical Construction Allowance: \$ 15,000.00

Total Base Bid EC-1 Price: \$ _____

Total bid price written in words

Alternates to BASE BID EC-1 - Electrical Construction**Alternate No. 1 to Base Bid EC-1**

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and electrical construction for additional generator loads at Golden Hill E.S.**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

Alternate No. 2 to Base Bid EC-1

The contractor shall state the complete price to be **(added to)** the base bid to perform all work, including but not limited to, **demolition and electrical construction for Lobby and Cafeteria lighting replacement at S.S. Seward Institute**, as indicated on drawings and specified herein.

ADD: _____
Bid price written in words

\$ _____
Bid price in dollars and cents

FLORIDA UNION FREE SCHOOL DISTRICT**BID PROPOSAL FORM**

The Board of Education hereby reserves the right to accept or reject any item set forth individually in Paragraph Nine above. The Owner may determine the lowest bid by adding one base bid to other base bid(s) and/or by adding to or deducting from those base bid(s), additive or deduct alternates, unit prices, or substitutions, if any, which the Owner elects to accept after the opening of bids.

Tenth: BID SECURITY

Each bidder shall deposit with his bid a bid bond, bank draft, or certified check in the amount of not less than ten percent (10%) of the Base Bid made payable to:

Board of Education, Florida Union Free School District
in the amount:

_____ \$(_____)

AND agrees such surety shall be a measure of liquidated damages should he default in delivery of agreement.

Eleventh: COMPLETION (Contractor shall fill in number of days)

It is intended that the work under this contract be completed substantially within _____ consecutive calendar days after receipt of authorized letter of intent issued by the District.

Twelfth: NON-COLLUSIVE BIDDING CERTIFICATION
General Municipal Law, Section 103-d
(Submit with Bid Proposal Form)

A. By submission of this bid, the bidder and each person signing on behalf of the bidder certifies, and if this is a joint bid each party hereto certifies as to its own organization, under penalty of perjury that to the best of the bidder's knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit a bid for the purpose of restricting competition.

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

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

- C. If the bidder is a corporation, the corporation shall be deemed to have been authorized by the Board of Directors of the bidder to make the above certification and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

(Seal of Corporation)

Corporate or Company Name

By: _____
Signature Title

Date: _____

Thirteenth:

On acceptance of this proposal for said work, the undersigned hereby binds himself or themselves to enter into written contract with the Board of Education within ten (10) days of date of notice of award, and to comply in all respects with the provisions set forth in "Instructions for Bidders" and "General Conditions of Contract" in relation to security for the faithful performance of the terms of said contract.

IF A CORPORATION (Seal of corporation):

NAME

ADDRESS

President

Secretary

Treasurer

IF A FIRM:

NAME OF MEMBERS

ADDRESS

PROPOSED EQUIVALENT FORM

Project: Bond Phase II-Golden Hill ES, SS Seward Inst. and SS Seward Memorial

Name of Bidder (Corporate Name): _____

Date: _____ Prime Contract For _____

In accordance with Instructions to Bidders, Article 8, the above listed Bidder proposes the following materials, equipment, or methods for consideration by the Architect as equivalents to those specified or shown in the Contract Documents, and for incorporation into the Work at no additional cost to the Owner. The Contractor is aware of the risk of acceptance.

Project Manual Section Number
and Specified Product

Proposed
EquivalentThis image shows a blank sheet of white paper with horizontal ruling lines. The page is divided into two equal-width vertical sections by a central vertical crease. Each section contains ten evenly spaced horizontal lines, providing a template for writing or drawing. There are no margins, text, or other markings on the page.

PROPOSED SUBSTITUTION FORM

The Base Bid Contract Sum proposed by the undersigned on the preceding Bid Proposal Form is based upon all items exactly as shown and described in the Contract Documents. For the Owner's consideration, the Bidder proposes the following substitute materials, equipment, or methods to be used in the work, in lieu of those specified, with a credit for cost savings to the Owner if accepted. Refer to Article 8(c) of the Instructions to Bidders.

	Specified Product and Section Number	Proposed Substitute	Credit Amount
1.	_____ _____	_____ _____	\$ _____
2.	_____ _____	_____ _____	\$ _____
3.	_____ _____	_____ _____	\$ _____

Name of Bidder (Corporate Name): _____

Date: _____ By: _____
Signature of Corporate Officer

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

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

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

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

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

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

SIGNED

SWORN to before me this

_____ day of _____

201____

Notary Public: _____

**DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH
THE IRAN DIVESTMENT ACT**

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

Name of the Bidder: _____

Address of Bidder: _____

Has bidder been involved in investment activities in Iran? _____

Describe the type of activities including but not limited to the amounts and the nature of the investments (e.g. banking, energy, real estate) _____

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

Have the investment activities ended? _____

If so, what was the date of the last investment activity? _____

If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran? _____

If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any and a copy of the formal plan. _____

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

I, _____ being duly sworn, deposes and says that he/she is the _____ of

the _____ Corporation and the foregoing is true and accurate.

SIGNED

SWORN to before me this

_____ day of _____

201____

Notary Public: _____

IRAN DIVESTMENT ACT COMPLIANCE RIDER
FOR SCHOOL DISTRICTS

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law (“SFL”) §165-a and General Municipal Law (“GML”) §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the District, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

- (a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- (b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the SFL and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder’s certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the SFL. In any case where the bidder or proposer cannot certify that it is not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The District may award a bid to a bidder who cannot make the certificate on a case by case basis if:

- (1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
- (2) The District makes a determination that the goods or services are necessary for the District to perform its functions and that, absent an exemption, the District would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

STATEMENT OF BIDDER'S QUALIFICATIONS

1. Name of Bidder:

2. Type of Business Entity:

3. If the bidder is a corporation, state the date and place of incorporation of the corporation. If a partnership, state the date of organization and type of partnership. If individually owned, state the date of organization. If the form of your organization is other than those listed above, please describe.

4. For how many years has the bidder done business under its present name, and how many years has your organization been in business as a contractor?

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

5b. Under what other or former names has your organization operated?

6. Have any of the persons listed in Number 5 owned/operated/been shareholders in any other companies? If so, please state name of the person(s) who has owned/operated/been shareholders and name(s) of other companies:

7. Has your organization ever failed to complete any work awarded to it?

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

9. During the three year period preceding the submission of this bid, has the bidder been found guilty of any OSHA Violations? If the answer to this question is yes, describe the nature of the OSHA violation, an explanation of remediation or other steps taken regarding such violation(s).

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

11. During the five year period preceding the submission of this bid, has the bidder been named as a party in any lawsuit in an action involving a claim for personal injury or wrongful death arising from performance or work related to any project in which it has been engaged? If the answer to this question is yes, list all such lawsuits, the index number associated with said suit and the status of the lawsuit at the time of the submission of this bid.

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

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

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

15. Has the bidder, its officers, directors, owner and/or managerial employees been convicted of a crime or been the subject of a criminal indictment during the five years preceding the submission of this bid? If the answer to this question is yes, list the name of the individual convicted or indicated, the charge against the individual and the date of disposition of the charge.

16. During the five year period preceding the bidder's submission of this bid, has the bidder been charged with and/or found guilty of any violations of federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations? If the answer to this question is yes, list the nature of the charge against the bidder, the date of the charge, and the status of the charge at the time of the submission of this bid.

17. Does the bidder have any major construction projects ongoing at the time of the submission of this bid? If the answer to this question is yes, list the projects on which the bidder is currently working, the percentage complete, and the owner, architect, contract amount and the expected date of completion of said project. State total worth of work in progress and under contract.

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

19. Are there any other judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

Dated:

By: _____
(Signature)

(Print Name and Title)

Sworn to before me this

_____ day of _____, 201__.

Notary Public



AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name and

Title:

(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

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____



AIA[®] Document A312[™] – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:

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

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

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

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner 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

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

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AIA[®] Document A132[™] – 2009

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

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

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

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

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

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

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

BBS Architects, Landscape Architects and Engineers P.C.
244E Main Street
Patchogue, New York 11772

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

This document is intended to be used in conjunction with AIA Documents A232[™]–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132[™]–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132[™]–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232[™]–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS
10	INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

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

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

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than () days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Portion of the Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

- ☐ Stipulated Sum, in accordance with Section 4.2 below
- ☐ Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below
- ☐ Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

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

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.2.3 Unit prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.2.4 Allowances included in the Stipulated Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance
------	-----------

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ 4.3.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

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§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rate paid at the place of the Project.

§ 4.3.6 Unit prices, if any:

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager for the Owner, in writing, a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the items in Section A.1 of Exhibit A, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price

§ 4.4.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ 4.4.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rate paid at the place of the Project.

§ 4.4.6 Unit Prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.4.7 Guaranteed Maximum Price

§ 4.4.7.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed (\$), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

(Insert specific provisions if the Contractor is to participate in any savings.)

§ 4.4.7.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

§ 4.4.7.3 Allowances included in the Guaranteed Maximum Price, if any:
(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)

Item	Allowance
------	-----------

§ 4.4.7.4 Assumptions, if any, on which the Guaranteed Maximum Price is based:

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the day of the month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment shall be made by the Owner not later than () days after the Construction Manager receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

§ 5.1.4.3 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;
- .2 Add 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), less retainage of percent (%);
- .3 Subtract the aggregate of previous payments made by the Owner; and

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- .4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to percent (%) of the Contract Sum, less such amounts as the Construction Manager recommends and the Architect determines for incomplete Work and unsettled claims; and
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

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

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price

§ 5.1.5.1 With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit A, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

§ 5.1.5.2 Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.

§ 5.1.5.3 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take the Cost of the Work as described in Exhibit A, Determination of the Cost of the Work;
- .2 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work described in that Section at the rate stated in that Section; or if the Contractor's Fee is stated as a fixed sum, an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- .3 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;
- .4 Subtract the aggregate of previous payments made by the Owner;
- .5 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Article 5 or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- .6 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or withdrawn a Certificate for Payment as provided in Section 9.5 of AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon (1) a mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used

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amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor; less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

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

§ 5.1.6.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work for which the Contractor has made or intends to make actual payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 5.1.6.4 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.10 of AIA Document A232-2009;
- .2 Add that portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work, or if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing;
- .3 Add the Contractor's Fee, less retainage of percent (%). The Contractor's Fee shall be computed upon the Cost of the Work at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, shall be an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- .4 Subtract retainage of percent (%) from that portion of the Work that the Contractor self-performs;
- .5 Subtract the aggregate of previous payments made by the Owner;
- .6 Subtract the shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- .7 Subtract amounts, if any, for which the Construction Manager or Architect have withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A232-2009.

§ 5.1.6.5 The Owner and the Contractor shall agree upon a (1) mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 5.1.6.6 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Construction Manager or Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; that the

Init.

Construction Manager or Architect have made exhaustive or continuous on-site inspections; or that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.6.7 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2009, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and
- .3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232–2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232–2009, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, 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.)

- ☐ Arbitration pursuant to Section 15.4 of AIA Document A232–2009.
- ☐ Litigation in a court of competent jurisdiction.
- ☐ Other: *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009.

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price
§ 7.2.1 Subject to the provisions of Section 7.2.2 below, the Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.2.2 The Contract may be terminated by the Owner for cause as provided in Article 14 of AIA Document A232–2009; however, the Owner shall then only pay the Contractor an amount calculated as follows:

- .1 Take the Cost of the Work incurred by the Contractor to the date of termination;
- .2 Add the Contractor's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Sections 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and
- .3 Subtract the aggregate of previous payments made by the Owner.

§ 7.2.3 If the Owner terminates the Contract for cause when the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, and as provided in Article 14 of AIA Document A232–2009, the amount, if any, to be paid to the Contractor under Section 14.2.4 of AIA Document A232–2009 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.2.

§ 7.2.4 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders.

§ 7.2.5 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009; in such case, the Contract Sum and Contract Time shall be increased as provided in Section 14.3.2 of AIA Document A232–2009, except that the term 'profit' shall be understood to mean the Contractor's Fee as described in Sections 4.3.2 and 4.4.2 of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 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.)

%

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

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

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

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

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

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

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
---------	-------	------	-------

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
--------	------	-------

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:

- 1 AIA Document A132™–2009, Exhibit A, Determination of the Cost of the Work, if applicable.
- 2 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

- 3 AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, if completed, or the following:

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- 4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232–2009 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor’s bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232–2009.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232–2009.)

Type of Insurance or Bond

Limit of Liability or Bond Amount (\$0.00)

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

OWNER (Signature)

CONTRACTOR (Signature)

(Printed name and title)

(Printed name and title)

Init.

Application and Certificate for Payment

The following AIA Document G702 or G732 and G703 shall be utilized.

The General Conditions and Supplemental Conditions (if any) state required accompanying documents.

Applications and Certificates for Payment shall be assembled and transmitted as follows:

- Provide four original Applications and Certificates for Payment if there is a Construction Manager, three originals if not. One original and photocopies are unacceptable.
- If there is a Construction Manager, utilize the Construction Manager-edition AIA Application and Certificate for Payment, and the Construction Manager must have signed all originals before transmitting them to BBS.
- Lien Releases and Affidavits are required for every Application and Certificate for Payment except the first.
- Certified Payroll is required for every Application and Certificate for Payment that includes any amount of labor.
- The first Application and Certificate for Payment will not be processed until acceptable Bonds and Insurances are submitted and approved.
- The first Application and Certificate for Payment that includes any amount of labor, and thus Certified Payroll, must contain OSHA 10 cards. OSHA 10 cards must also be provided on subsequent Applications and Certificates for Payment where any new or additional worker is employed.
- The four or three original Applications and Certificates for Payment shall be complete and separate packages; all attachments must be affixed to every original application.

The Architect/Engineer and/or Construction Manager will not disassemble, rearrange, or reproduce any Application and Certificate for Payment, or portion thereof, to bring them into compliance. Incomplete or improperly arranged Applications and Certificates for Payment will be rejected and returned to the Contractor.

Application and Certificate for Payment, Construction Manager as Adviser Edition

TO OWNER:

PROJECT: _____ Tenpalte

APPLICATION NO: _____

DISTRIBUTION TO:

OWNER
CONSTRUCTION MANAGER
ARCHITECT
CONTRACTOR
FIELD
OTHER

FROM
CONTRACTOR:
CONTRACT FOR: General Construction

VIA CONSTRUCTION
MANAGER:
VIA ARCHITECT:

PERIOD TO:
CONTRACT DATE:
PROJECT NOS: / /

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703[™], Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM \$ 0.00
2. NET CHANGES IN THE WORK \$ 0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2) \$ 0.00
4. TOTAL COMPLETED AND STORED TO DATE (Column G on G703) \$
5. RETAINAGE:

a. 0 % of Completed Work
(Column D + E on G703) \$ 0.00

b. 0 % of Stored Material
(Column F on G703) \$ 0.00

- Total Retainage (Lines 5a + 5b, or Total in Column I on G703)..... \$ 0.00
6. TOTAL EARNED LESS RETAINAGE \$ 0.00
(Line 4 minus Line 5 Total)
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT \$
- (Line 6 from prior Certificate)
8. CURRENT PAYMENT DUE \$ 0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE
(Line 3 minus Line 6) \$ 0.00

SUMMARY OF CHANGES IN THE WORK	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$
Total approved this month including Construction Change Directives	\$	\$
TOTALS	\$ 0.00	\$ 0.00
NET CHANGES IN THE WORK	\$	0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of: _____

County of: _____

Subscribed and sworn to before
me this _____ day of _____

Notary Public: _____

My Commission expires: _____

CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on evaluations of the Work and the data comprising this application, the Construction Manager and Architect certify to the Owner that to the best of their knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

CONSTRUCTION MANAGER:

By: _____ Date: _____

ARCHITECT: (NOTE: If Multiple Prime Contractors are responsible for performing portions of the Project, the Architect's Certification is not required.)

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

Continuation Sheet

_____ AIA Document, G702™-1992, Application and Certification for Payment, or G736™-2009, Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.

In tabulations below, amounts are in US dollars.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

[illegible]



NEW YORK CONSTRUCTION CERTIFICATE OF LIABILITY INSURANCE ADDENDUM

DATE (MM/DD/YYYY)

THIS ADDENDUM SUMMARIZES SOME OF THE POLICY PROVISIONS IN THE REFERENCED INSURANCE POLICIES AND IS ISSUED AS A MATTER OF INFORMATION ONLY; IT CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. ALL TERMS, EXCLUSIONS AND CONDITIONS IN THE ACTUAL POLICY SHOULD BE CONSULTED FOR A MORE DETAILED ANALYSIS OF COVERAGE, AS THIS ADDENDUM DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES.

AGENCY		NAMED INSURED(S)	
POLICY NUMBER	EFFECTIVE DATE	CARRIER	NAIC CODE

ADDENDUM INFORMATION**CERTIFICATE NUMBER:****REVISION NUMBER:****A. Insurer**

- ☐ Admitted / authorized
- ☐ Excess line or free trade zone

B. General Liability (GL) policy form

- ☐ ISO / ISO modified
- ☐ Other

C. Specific operations excluded or restricted (GL policy)

- ☐ Location: _____
- ☐ Type of construction: _____
- ☐ Building height: _____
- ☐ Classifications [see attached declarations / endorsement]
- ☐ Designated work [see attached endorsement]

D. Additional insured endorsement (GL policy)

- ☐ CG 20 10 ☐ CG 20 26 ☐ CG 20 32 ☐ CG 20 33 ☐ CG 20 37 ☐ CG 20 38
- ☐ Other: #: _____ Title: _____

E. According to the terms of this GL policy, the additional insured has primary and noncontributory coverage

- ☐ Yes ☐ No and ☐ no other option is available with this insurer

F. Additional insured will receive advance notice if insurer cancels (GL policy)

- ☐ Yes ☐ No and ☐ no other option is available with this insurer

G. Blanket contractual liability located in the "insured contract" definition (Section V, Number 9, Item f. in the ISO CGL policy) is removed or restricted

- ☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

H. "Insured contract" exception to the employers liability exclusion is removed or modified (GL policy)

- ☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

I. GL policy (including endorsements) does not cover the additional insured for claims involving injury to employees of the named insured or subcontractors (not workers' compensation)

- ☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

J. Earth movement, excavation or explosion / collapse / underground property damage is excluded or restricted (GL policy)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

K. Insured vs. insured suits (cross liability in the ISO CGL policy) are excluded or restricted (other than named insured vs. named insured)

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

L. Property damage to work performed by subcontractors (exception to the "damage to your work" exclusion in the ISO CGL policy) is excluded or restricted

☐ Yes and ☐ no other option is available with this insurer ☐ No changes made

M. Excess / umbrella policy is primary and non-contributory for additional insureds

☐ Yes, by specific policy provision ☐ Yes, by endorsement ☐ No and ☐ no other option is available with this insurer

AUTHORIZED REPRESENTATIVE SIGNATURE

DATE (MM/DD/YYYY)

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location And Description Of Completed Operations

Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to Section III – Limits Of Insurance:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – AUTOMATIC STATUS FOR OTHER
PARTIES WHEN REQUIRED IN WRITTEN
CONSTRUCTION AGREEMENT**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. Section II – Who Is An Insured is amended to include as an additional insured:

1. Any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy; and
2. Any other person or organization you are required to add as an additional insured under the contract or agreement described in Paragraph 1. above.

Such person(s) or organization(s) is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

- a. Your acts or omissions; or
- b. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured.

However, the insurance afforded to such additional insured described above:

- a. Only applies to the extent permitted by law; and
- b. Will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

A person's or organization's status as an additional insured under this endorsement ends when your operations for the person or organization described in Paragraph 1. above are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:
 - a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
 - b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of, or the failure to render, any professional architectural, engineering or surveying services.

2. "Bodily injury" or "property damage" occurring after:
 - a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or

b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

The most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement described in Paragraph **A.1.**; or

2. Available under the applicable Limits of Insurance shown in the Declarations; whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

SAMPLE

BBS ARCHITECTS LANDSCAPE ARCHITECTS ENGINEERS

FREDERICK W. SEEBA, PE, MANAGING PARTNER
LAWRENCE SALVESEN, AIA, PARTNER
KEVIN J. WALSH, AIA, PARTNER
KENNETH G. SCHUPNER, AIA, PARTNER
JOSEPH B. RETTIG, AIA, PARTNER
GARY W. SCHIEDE, AIA, PARTNER
ROGER P. SMITH, AIA, FOUNDING PRINCIPAL

Date: _____

Owner: _____

Project: _____

Contractor: _____

Dear Sir/Madam:

Reference is made to your contract with _____ for the above referenced Project. By signing below, you hereby acknowledge and agree, that for valuable consideration, the receipt of which is acknowledged, you covenant and agree that BBS Architects, Landscape Architects & Engineers PC, shall be added as an "additional insured" to your casualty and commercial liability insurance policies required under the Contract, including all primary and excess policies, limits, and terms and conditions contained therein, and further agree that an insurance certificate and endorsement confirming that this entity was added as an "additional insured" on such policies of insurance shall be provided by you prior to the commencement of work on the Project.

In addition, you further covenant and agree to hold harmless, indemnify and defend BBS Architects, Landscape Architects, and Engineers, PC to the same extent that you are required to hold harmless, indemnify and defend the Owner under the Contract, however, Contractor is not responsible for defense and indemnity for claims, demands or suits caused solely by Architect's professional negligence.

Acknowledged and agreed to by:

Name

Signature

Contractor

Rev. 12-31-18



AIA[®] Document G706[™] – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

TO OWNER: *(Name and address)*

CONTRACT FOR:

CONTRACT DATED:

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA[®] Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT
NUMBER:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

TO OWNER: *(Name and address)*

CONTRACT FOR:
CONTRACT DATED:

SURETY: ☐

OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens,
conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from
Subcontractors and material and equipment
suppliers, to the extent required by the Owner,
accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

*(Signature of authorized
representative)*

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA[®] Document G707[™] – 1994

Consent Of Surety to Final Payment

PROJECT: <i>(Name and address)</i>	ARCHITECT'S PROJECT NUMBER:	OWNER: <input type="checkbox"/>
	CONTRACT FOR:	ARCHITECT: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT DATED:	CONTRACTOR: <input type="checkbox"/>
		SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of
(Insert name and address of Contractor)

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety
of any of its obligations to
(Insert name and address of Owner)

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:
(Seal):



AIA[®] Document G707A[™] – 1994

Consent of Surety to Reduction in or Partial Release of Retainage

PROJECT: <i>(Name and address)</i>	ARCHITECT'S PROJECT NUMBER:	OWNER: <input type="checkbox"/>
	CONTRACT FOR: n	ARCHITECT: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT DATED:	CONTRACTOR: <input type="checkbox"/>
		SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of
(Insert name and address of Contractor)

hereby approves the reduction in or partial release of retainage to the Contractor as follows:

The Surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:
(Seal):



AIA®

Document A232™ – 2009

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

for the following PROJECT:

(Name, and location or address)

THE CONSTRUCTION MANAGER:

(Name, legal status and address)

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

ADDITIONS AND DELETIONS:

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

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

This document is intended to be used in conjunction with AIA Documents A132™–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

Init.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding 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 the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 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 and certify termination of the Agreement under Section 14.2.2.

§ 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.

§ 1.2.2 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 will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment 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 this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them 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 material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form

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

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 Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 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. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 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.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or 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.

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 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 2.2.3, 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 Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 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 Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make 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 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, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and 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 written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required 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 performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

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

§ 3.4 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 authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a 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

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

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

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

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work 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, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and

Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed 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, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 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 furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply 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, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at

appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

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

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

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 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 the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

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

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

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

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

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

§ 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. 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 cause such services or certifications to be provided by a properly 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, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

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

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and 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's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's 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 or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and 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 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 AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 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.

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

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

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and 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. 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 report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

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

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

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

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

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

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

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

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

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

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar

required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the

Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

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

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 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 in writing; 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 such 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 OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, 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, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; 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, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

§ 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 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and 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.

§ 7.3.6 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.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and 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 Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .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 related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

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

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

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

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, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 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 an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order 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

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.

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager 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. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material 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 Construction Manager and 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 material 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, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques,

sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work 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 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 the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. 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 Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction

Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment 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 and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's 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 Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, 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 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 notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all 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 such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed 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 surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment 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; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing 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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction or operations by the Owner or other Contractors.

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

§ 10.2.3 The Contractor shall 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 owners and users of adjacent sites and utilities.

§ 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, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly

employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

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

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence 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 indemnify 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 Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in 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 the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the

Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining 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, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 **Waivers of Subrogation.** 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, and (2) the Construction Manager, Architect, Architect's consultants, separate contractors described in Article 6, 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 covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance 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 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 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 an 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 written 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 2.4.

§ 12.2.2.2 The one-year period 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, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors 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 except that, 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 such 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 such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 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.

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

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and

(2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may 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.

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time 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 the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

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 or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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 Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, 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 promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and 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 for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .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 above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, 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' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written 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 Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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, 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.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must 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 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein 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.

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

§ 15.1.6 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, 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 arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no 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 such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim 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 and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to 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 an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, 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 15.1.6 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 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. 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 Either party, at its sole discretion, 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 Either party, at its sole discretion, 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 the Owner and Contractor under this Agreement.



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Additions and Deletions Report for **AIA[®] Document A232[™] – 2009**

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

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 12:14:50 on 07/12/2016.

There are no differences.

Certification of Document's Authenticity

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I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 12:14:50 on 07/12/2016 under Order No. 1767259550_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

(CROSS-REFERENCE AIA DOCUMENT A232/CMA-2009)

1. List of Drawings

The Drawings, which are the graphic and pictorial portions of the Contract Documents that show the design, location and dimension of the Work are as listed within the "List of Drawings" provided with the drawing set. All Work under this Contract shall be executed in accordance with the Contract Documents, which are typically composed of the Project Manual, Specifications and Drawings. The Contract Documents are complimentary as described in the General Conditions. The "List of Drawings" will be incorporated in the Standard Form of Agreement Between the Owner and the Contractor.

2. Provision of Documents

- A. Each Prime Contractor is entitled to five printed sets of Drawings, three Project Manuals, and three sets of all Addenda materials. The three sets are inclusive of the original set obtained for bidding purposes. These sets will be provided at the Owners expense exclusive of the original Bid Deposit, which is forfeited by the awarded contractors.
- B. Additional sets of Contract Documents will be provided to the contractors for the cost of reproduction and distribution charges. Payment is due upon receipt of the Documents.
- C. Reproducible copies of the Drawings shall be provided upon the request of the Prime Contractor and are to be provided for the cost of reproduction and distribution charges. Payment is due upon receipt of the Documents.
- D. For expediency, at the discretion of the Architect, Prime Contractors may be directed to pick up documents at the project designated printing facility. This practice will not be permitted without authorization of/and coordination by the Architect.
- E. Electronic drawing files, AutoCAD format, may be available, at the discretion of the Architect, for a cost of \$25.00 per drawing. Contractors requesting this service will be required to sign a disclaimer. Request for electronic files must be made in writing to the Architects office. This request must include a specific list of drawings required in this format. In response, the architect will verify the drawings requested and will forward the disclaimer for signature. Electronic files will be released upon receipt of payment and a fully executed disclaimer form.

3. Minimum Rates of Wages

- A. In accordance with Section 220, Subdivision 3 and 220-d of the Labor Law, the Industrial Commissioner, Department of Labor, State of New

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York, has ascertained the prevailing rates of wages which will apply to this Project.

- B. The Prevailing Rates of Wages, which are the minimum hourly rates to be paid on this project, shall be indicated in the PW-3, PW-19, PW-202, PW-203, and PW-16 sheets enclosed.
 - C. Any person or corporation that willfully pays, after entering such contract, less than established wage schedule shall be guilty of a misdemeanor and, upon conviction, shall be punished for such first offense by a fine of \$500 or by imprisonment for not more than 30 days or both fined and imprisoned. A second offense carries a heavier penalty.
4. A.I.A. Documents
- A. The "General Conditions of the Contract for Construction" Standard A.I.A. Form A232CMA, 2009 edition, will become, under the Agreement, one of the Documents of the Contract and shall govern all Work under this Contract.
 - B. The following supplements modify the "General Conditions of the Contract for Construction," A.I.A. Document A232CMA, 2009 Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.
 - C. **Article 1 - General Provisions**

1.1 Basic Definitions

Add the following Subparagraph to 1.1.2:

- 1.1.2.1 Where the term "Contract" or "Prime Contract" is used in the General Conditions, Supplementary Conditions, and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Division 1.

1.2 Correlation and Intent of the Contract Documents

Add new subparagraph 1.2.4:

In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities.

- 1. Modifications issued after execution of the Agreement.
- 2. The Agreement Between the Owner and the Contractor.
- 3. Addenda, issued prior to the execution of the Agreement, with those of later dates having precedence over those of earlier dates.

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4. The Supplementary Conditions, Rider to the General Conditions, Special Provisions or Requirements (if any).
5. The General Conditions of the Contract for Construction.
6. Drawings and Specifications.

After execution of the Agreement and during the course of the Work should any ambiguities, discrepancies, omissions, or apparent errors be found on the drawings or in the specifications to which the Contractor has failed to call attention prior to submitting his bid, then the intention of the Contract Documents is to be interpreted by the Architect.

The Architect's decision as to the intent shall be final, and the Contractor hereby agrees to carry out the Work in accordance with the decision of the Architect.

Until such time as an interpretation is issued, it shall be assumed that the Contractor has based his bid on providing the Work in the better quality, greater quantity, or most expensive manner, for Work complete in every detail, even though every item necessarily involved is not particularly mentioned.

If necessary measurements are missing or Work specified or shown in the Contract Documents is obviously incorrect or impossible to execute, or figures fail to check, the Contractor shall call these facts to the attention of the Architect for interpretation as described above.

D. **Article 2 - Owner**

2.3 Owner's Right to Stop the Work

Add new subparagraph 2.3.1

- 2.3.1 "If the Contractor fails to correct Work which is not in accordance with the requirements of Contract Documents as required by Section 12.2 or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time or fails to remove and discharge (within ten days) any lien filed upon Owner's property by anyone claiming by, through, or under Contractor, or disregards, the instruction of the Architect, Construction Manager or Owner when based on the requirements of the Contract Documents, the Owner, by written order signed personally or by an agent so empowered by the Owner, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated (as determined by the Owner or its agency); however, the

right of Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right either on its behalf or for the benefit of the Contractor or any other person or entity. The Contractor shall stop work upon receipt of said order the written order described herein above may be delivered to and shall be deemed received by the Contractor in the same manner as set forth in paragraph 2.4.1.1."

2.4 Owner's Right to Carry Out the Work

Add after second sentence of 2.4 the following sentence:

If the Owner, Architect or Construction Manager (if applicable) request that any of the Prime Contractors perform additional work which is not included in the Construction Documents and which will result in either additional cost or additional time a fully executed Change Order is required.

The Contractor shall submit a proposal for the additional work. This proposal shall contain a complete itemization of the costs associated with the work inclusive of all labor and materials. All proposals for any work that the Contractor, its Subcontractors or Subcontractors of subcontractors perform in connection with the additional work shall be submitted utilizing the format contained herein below (item 7.2.3). In no event shall the total for overhead and profit on any Change Order exceed fifteen percent (15%) of the cost of the work.

1. Any proposals submitted without an itemized breakdown as indicated herein will be returned for resubmission.
2. For work performed by the Prime Contractor, fifteen percent (15%) overhead and profit is permitted for their labor and material costs.
3. Overhead can only be applied to the cost of labor and materials, including delivery.
4. Overhead and profit is not permitted on rental of equipment and machinery.
5. Equipment and machinery costs shall not include items already on site and under use for the base contract.
6. Additional bond costs shall be 2 % maximum.
7. Insurance costs fall within overhead costs.
8. Subcontractor proposals in connection with the work shall include a maximum of ten percent (10%) overhead and profit for their work.

9. The Prime Contractor is permitted five percent (5%) profit on the work of its Subcontractor as indicated in the Table at 7.2.3.
10. Under no circumstance shall the Contractor or its Subcontractors be entitled to overtime costs unless otherwise agreed and approved by the Owner. (Ref Article 8 - Time)
11. A change in the Contract sum shall only be accomplished by a written Change Order. Payments cannot be issued against a Change Order unless it has been fully executed.
12. Adjustments in time if required will be in accordance with Article 8.

Proposals for additional work shall be submitted in the following format accompanied by sufficient substantiating data to permit a proper evaluation.

	Proposed Change Order	Estimated cost
A	Prime Contractors Materials (itemized quantities & cost)	
B	Prime Contractors Labor (itemized)	
C	Subtotal (A+B)	
D	Any credit due shall be applied here	
E	Overhead 10% of Subtotal	
F	Subtotal (C+D+-E)	
G	Subcontracted work (include itemized quantities and costs and 10% max OH&P)	
H	Subtotal (F+G)	
I	Prime Contractors Profit 5%	
J	Subtotal (H+I)	
K	Equipment and Machinery Rental (itemized)	
L	Bond Costs (2% max)	
M	Total Proposed Change Order (J+K+L)	

E. Article 3 - Contractor

3.2 Review of Contract Documents and Field Conditions by Contractor

Add new subparagraph 3.2.5:

- 3.2.5 The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and that the Drawings, the Specifications and all addenda are sufficient to enable the Contractor to construct the

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Work outlined therein in accordance with applicable laws, statues, building codes and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. In addition, if the Contractor performs any construction activity and if it knows or should have know that any of the Contract Documents contains an error, inconsistency or omission, the Contractor shall be responsible for such performance and shall bear the costs for correction thereof.

3.3 Supervision and Construction Procedures:

3.3.2 Insert the following language (noted in *italic*) in Paragraph 3.3.2: *"...and other persons performing portions of the Work under a Contract or other arrangement with the Contractor."*

3.4 Labor and Materials:

Add the following Paragraphs to 3.4:

3.4.4 The Contractor shall check all materials and labor entering into the Work site and shall keep full detailed accounts thereof.

3.4.5 The Contractor acknowledges that it is the Contractor's responsibility to hire all personnel for the proper and diligent execution of the Work and the Contractor shall maintain labor peace for the duration of the Project. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract schedule of the Contract Sum.

3.5 Warranty:

Add the following at the end of 3.5.1:

The Contractor will be responsible for and shall make good any defects due to faulty materials for two (2) years and two (2) years on labor after final payment has been made, except where sections of the Specifications call for a longer period of time.

3.9 Superintendent:

Add the following new subparagraph:

3.9.8 Qualifications of Superintendent: The Contractor shall employ a Superintendent, for the duration of the Project, whose qualifications meet or exceed those listed below. Prior to employing the Superintendent, the Contractor shall submit to the Architect the name of the proposed Superintendent and, if requested by

the Architect, a statement attesting to his qualifications.

1. Five (5) years of experience as a Superintendent in the particular construction discipline required by the Contract.
2. Superintendent on at least two (2) construction projects equal to, or greater than, the Contract Sum for this Contract.
3. Superintendent on at least two (2) projects of similar construction types and procedures as this Project.

3.12 Shop Drawings, Product Data, and Samples:

Add the following to the end of paragraph 3.12.1:

"The shop drawings shall include fabrication, erection, layout, and setting drawings and schedules, wiring and piping diagrams; and any other information required for proper approval of or installation of all parts of the Work specified. If any modifications are required to a standard item, such modifications shall be clearly shown or noted at the time of submission of shop drawings."

Add the following to the end of paragraph 3.12.5:

"All submissions shall be in accordance with Section 01300 Submissions."

Add the following to the end of paragraph 3.12.6:

"Contractor shall be responsible for verification of field dimensions and conditions and shall furnish such information to the Architect when requested. Before Contractor proceeds with the Work in question, the Contractor should field verify all dimensions. In case of doubt about dimensions, he should notify the Architect immediately for instructions."

Add the following new Paragraphs to 3.12:

3.12.11 Samples shall be properly labeled, giving the following information as applicable:

1. Project name and location.
2. Name, finish, and composition of material.
3. Location where material is to be used.
4. When approved, samples shall be so indicated.

5. Labels shall be large enough for approval stamp.

F. **Article 5 - Subcontractors**

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

Add the following Subparagraphs to 5.2.1:

5.2.1.2 Refer to Instructions to Bidders, Section 4, for requirements for delivery of "Contractor's Subcontractor List" to Architect's office after receipt of bids and before award of the Contract."

Delete Subparagraph 5.2.3 in its entirety and substitute the following:

5.2.3 Approval of a subcontractor may be revoked or withdrawn, if, in the opinion of the Architect, such subcontractor evidences an unwillingness or inability to perform his Work in strict accordance with the Contract Documents.

Add the following Paragraph to 5.2:

5.2.5 All subcontracts over \$5,000 shall be in writing with copies of written subcontract provided to the Owner upon request.

G. **Article 6 - Construction by Owner or By Other Contractors**

6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts:

Add the following Subparagraph to 6.1.2:

6.1.2.1 The Contractor shall provide for coordination of his activities with the activities of each Prime Contractor. This includes, but is not limited to, the Owner's own forces or separate Contractor's employed directly by the Owner.

6.2 Mutual Responsibility:

Add the following Subparagraphs to 6.2.2:

6.2.2.1 Each Prime Contractor shall promptly correct discrepancies or defects in their Work identified by other Prime Contractors as affecting proper execution and results of the Work of the other Prime Contractor.

Add the following Subparagraph to 6.2.5:

- 6.2.5.1 Claims and other disputes and matters in questions between the Contractor and other Prime Contractors shall be subject to the provisions of Article 15.

Add the following new Subparagraphs:

- 6.2.6 All required cutting, patching, and restoring shall be neatly done by mechanics skilled in their specific trades, to the satisfaction of the Architect.
- 6.2.7 The Contractor shall leave all Work of his trade WHOLE, PERFECT, AND COMPLETE at the final completion of the Work.

H. **Article 8 - Time**

8.2 Progress and Completion:

Add the following Subparagraph to 8.2.1

- 8.2.1.1 The Contractor recognizes that the Project Schedule is of critical importance to the Owner. All aspects of construction must reflect a 'time is of the essence' construction strategy. The 'Bid Schedules' serve as a guide of critical milestone dates to the Project. Failure to meet intermediate milestone dates will jeopardize the overall Project Schedule. If the Contractor's performance of the Work evidences, to the Owner or Architect, that the completion day may be in jeopardy, this will mandate Contractor(s) to increase staff, work overtime, or use other means to recover time, at the costs of those Contractor(s) responsible for such delays. In addition, all costs due to delays in completion of the Work shall be borne by Contractor(s) responsible for delays.

8.3 Delays and Extensions of Time:

Delete Paragraph 8.3.1 and replace with the following:

- 8.3.1 "If the Contractor is delayed at/in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Owners Representative written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Owner's Representative may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek

an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the Architect, Construction Manager, or the Owner, physical damage to the Project over which the Contractor has no control, labor disputes beyond the control of the Contractor, and unusually severe weather conditions not reasonably anticipated (temperature, rain, or other precipitation within a range of twenty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions) or by fire, unavoidable casualties or by other causes beyond the Contractors reasonable control. Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions. The Contractor agrees not to make claims for financial compensation for delays or acceleration in the performance of the Work resulting from acts or failure to act by the Owner, the Architect, Construction Manager, or the employees, agents, or representatives of the Owner, Construction Manager, or the Architect and agrees that such claim shall be fully compensated by an extension of time to complete the Work, regardless of when granted. Contractor delayed by Work of other Contractors shall make claims against delaying Contractor and not the Owner."

Add the following Subparagraphs to 8.3.1:

8.3.1.4 When the Contract Time has been extended, as provided under this Paragraph 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs or other similar reasons.

Delete paragraph 8.3.2 and replace as follows:

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of this Agreement. A copy of any Claim for extension of time shall be delivered to the Owner, the Architect and the Construction Manager, and the Contractor shall immediately take all steps reasonably possible to lessen the adverse impact of such delay to the Owner.

Delete paragraph 8.3.3 and replace as follows:

8.3.3 In no event shall the Contractor be entitled to monetary damages for delay under the Contract.

A new paragraph 8.3.4 shall be added as follows:

8.3.4 To the extent the Contractor is required to work during overtime hours, weekend, holidays or at other times which are not regularly scheduled, due to the fault of the Contractor, the Contractor shall be responsible for the costs incurred by the Owner, Architect, the Construction Manager and the others attributable to working during periods which have not been ordinarily scheduled. To the extent the Contractor elects to work during these periods to facilitate the schedule, the Owner may, at its sole option, allow the Contractor to do so without the Contractor incurring the additional costs referenced above.

I. **Article 9 - Payments and Completion**

9.2. Schedule of Values:

9.2.1 In the first sentence, after Construction Manager, add "and the Architect".

9.3 Application for Payment:

9.3.1 In the second sentence, delete the words "if required."

Add the following Subparagraphs to 9.3.1.3:

9.3.1.3.1 Until final completion and acceptance of Work in accordance with Paragraph 9.10, the Owner shall pay 95 percent of the amount of each progress payment due the Contractor.

9.3.1.3.2 The application for payment shall be accompanied by the following documentation:

- a. A current contractor's lien waiver.
- b. Duly executed waivers of Public Improvement liens from all subcontractors and material suppliers representing satisfaction of payment of all amounts requested by the Contractor on behalf of such entities in any previous application for payment.
- c. Certified Payroll for all employees of the Contractor and employees of subcontractors performing Work on the Project.
- d. For contracts of \$250,000 and more, all Contractors and subcontractors must attach a copy

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of proof of completion of the OSHA 10 course to the first Certified Payroll submitted and on each succeeding payroll where any new or additional employee is first listed.

- e. Such other information which the Owner and/or the Architect request the Contractor furnish in connection with its Application for Payment.

Add the following Subparagraphs to 9.3.2:

9.3.2.4 Additionally, the Contractor must furnish the following information, where payment is requested for materials and equipment stored off the project site, as part of its Application for Payment:

1. Type of material must be specifically identified by the trade contractor.
2. Trade contractor must furnish an invoice from his supplier showing the total value of the material and/or equipment being stored off site.
3. Trade contractor must provide a Certificate of Insurance for the full value of the item plus 10 percent.

9.10 Final Completion and Final Payment:

Add the following Subparagraphs to 9.10.1:

9.10.1.1 "In case the Contractor neglects to carry out the provisions of this clause within a reasonable time after notice, the Owner may cause all defects to be remedied and all repairs to be made without notice to the Contractor and deduct same from any amount so retained and recover the balance, if any, from the Contractor. The order of the Architect as to the conditions of the Work constructed under this Contract, the extent of the remedies applies, and of the repairs made, and of the cost thereof, shall be binding and conclusive upon the Contractor, his assigns, and sureties.

Add the following Subparagraph to 9.10.2:

9.10.2.2 Submittals required above shall be made in accordance with procedures described in Division 1.

Add the following additional Clauses to Paragraph 9.10.4:

- .4 Claims for Indemnification;

- .5 Claims about which the Owner has given the Contractor written notice;
- .6 Claims arising after final payment."

J. **Article 10 - Protection of Persons and Property**

10.2 Safety of Persons and Property:

Add the following Subparagraph to 10.2.2:

- 10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all Costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fee, in recovering such defense costs from the Contractor.

Add the following new Subparagraph:

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

and Architect.

Add the following Subparagraph to 10.2.12:

- 10.2.12.1 The Contractor causing damage to the Work of another Contractor shall be responsible for the repair and replacement of such damaged Work. Back charges shall be made when corrections are not made promptly.
- 10.2.12.2 The Owner reserves the right to pay the Contractor originating the back charge from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the amount due the said responsible Contractor.
- 10.2.12.3 Contractor originating back charges will determine the amount of the back charges in accordance with Article 7, Changes in the Work, of the General Conditions of the Contract, in order to obtain the Architect's approval.
- 10.2.12.4 Contractors under direct Contract with the Owner will be expected to take care of back charges originating with Subcontractors under their employ under the terms and conditions as established in the General Conditions of the Contract, Article 5 and Article 6. Contractors under direct Contract with the Owner, and their Sureties, shall indemnify and save the Owner harmless from claims of this type, including paying for legal expenses necessary to remove or settle any liens or other legal claims against the Owner.

K. **Article 11 - Insurance and Bonds**

11.1 Contractor's Liability Insurance:

Add the following Subparagraph to 11.1.2:

- 11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than limits indicated in Division 1, Section 1C (submitted on A.I.A. Document G705, Certificate of Insurance) or greater as required by Law.

11.3 Property Insurance:

Add the following to Paragraph 11.3.1.1:

"The form of policy for this coverage shall be Completed Value."

Delete Paragraph 11.3.1.4 in its entirety and substitute the following:

11.3.1.4 The Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit, and stored on the site but not incorporated into the Work as full replacement cost basis without voluntary deductible.

11.4 Performance Bond and Payment Bond:

Add the following to Paragraph 11.4.1:

11.4.1 Bonds shall be obtained from a surety satisfactory to the Owner, licensed to do business in the state where the project is located. The amount of each bond shall be included in the Contract Sum. Each bond shall be maintained throughout the duration of the Project and shall remain in effect for a period of not less than two (2) years following final completion of the work by the Contractor.

Add the following subparagraph to 11.4.1:

11.4.1.4 The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the site, but no later than three (3) days after execution of the Contract, on A.I.A. Document A312, Performance Bond and Payment Bond.

L. Article 14 - Termination or Suspension of the Contract

14.1 Termination by the Contractor:

Add the following to 14.1.1:

14.1.1.5 In accordance with Section 103.1, General Municipal Law, if any person when called to testify before a Grand Jury concerning any transaction or contract with the State of New York or a political subdivision thereof, or a public authority, or a public department, agency, or official of any of the foregoing, refuses to sign a waiver of immunity against subsequent criminal prosecution or refuses to answer any relevant questions concerning such transaction or contract; then any such person, or any firm, partnership, or corporation of which he is a member, partner, director, or official shall be disqualified for a period of five (5) years after such refusal from submitted bids to, receiving awards, or entering into any contract with, any municipal corporation or department or agency or official thereof.

If such person refuses to sign a waiver of immunity

or to answer any relevant questions as aforesaid, then this Contract may be canceled or terminated by the Owner without the Owner incurring any penalty or damages by virtue of such cancellation or termination.

14.1.1.6 In accordance with Section 109, General Municipal Law, the Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract for the Work herein specified, or his right, title, or interest therein, or his power to execute the Contract, to any other person or corporation without the previous consent in writing of the Board of Education.

If the Contractor, without previous written consent of the Board of Education, shall assign, transfer, convey, sublet, or otherwise dispose of the Contract for the Work specified herein, or his power to execute the Contract, to any other person or corporation, the Board of Education shall be relieved of and discharged from any and all liability and obligations growing out of the Contract to the Contractor, and to the persons or corporation to which the Contract shall have been assigned, transferred, conveyed, sublet, or otherwise disposed of, and the Contractor, and his assignees, transferees, or sublessees shall forfeit and lose all monies theretofore earned under the Contract, except so much as may be required to pay his employees.

The above provisions of this paragraph shall not hinder, prevent, or affect any assignment by the Contractor for the benefit of his creditors made pursuant to the laws of the State of New York.

Article 15 - Claims and Disputes

15.1 Claims:

Add to Paragraph 15.1.2:

Failure to do so shall be an irrevocable waiver of the Claim.

Modify Paragraph 15.1.5.1 as follows:

Delete the text after "notice" in line 2 and substitute the following text and sentence, "shall be given by the Contractor to the Architect within 7 days of its commencement. The failure to give such notice shall constitute an irrevocable waiver of the Claim.

Delete from the second sentence the following, "of cost and"

In the event of a continuing delay, only one claim is necessary.

Add the following Subparagraphs to 15.1.5.1:

15.1.5.1.1 An application for extension of time must set forth in detail the nature of each alleged cause of delay, the dates upon which such cause of delay began and ended, the number of days attributable to each of such causes, and the probable effect of such causes on the previously approved progress schedule.

15.1.5.1.2 Failure to strictly comply with these requirements may, at the discretion of the Owner, be deemed sufficient cause on the previously approved progress schedule.

Add the following Subparagraph to 15.1.5.2:

15.1.5.2.1 In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

Add the following paragraph to 15.1:

15.1.7 The Owner shall not be liable to the Contractor and/or Subcontractor for financial Claims or monetary damages of any nature caused by or arising out of delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make any hereby waives any Claim for damages for delay, including, but not limited to, those resulting from increase labor or material costs; directions given or not given by the Owner, Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or review of shop drawings and requests for instruction(s); or, on account of any delay, obstruction or hinderance for any cause whatsoever by the Owner, Architect, or any other contractor on this Project, whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefore shall be an extension of time if appropriate. IT IS EMPHASIZED THAT NO MONETARY RECOVERY MAY BE OBTAINED BY THE

CONTRACTOR FOR DELAY AGAINST THE OWNER, CONSTRUCTION MANAGER, OR ARCHITECT BASED ON ANY REASON AND THAT THE CONTRACTOR'S SOLE REMEDY, IF APPROPRIATE, IS ADDITIONAL TIME.

15.2 Initial Decision:

Add to end of 15.2.1:

Add the following text at the end of the third sentence of this Subparagraph:..."provided, with respect to Claims submitted more than one year after payment is due, the decision by the Architect shall not be a condition precedent to litigation, and the Claim not need be submitted to the Architect.

Add the following Paragraph 15.2.9:

"Within 10 days of a written request, the Contractor will make available to the Owner or its representative books, records, or other documents in its possession or to which it has access relating to a claim and shall require its Subcontractors, regardless of tier, and materialmen to do likewise."

Add the following new article in its entirety:

Article 16-Indemnification

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

16.1.2 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, the Architect, the Architect's consultants, and agents and employees 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 its work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction, of tangible

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property including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this paragraph 16.1.2. The Contractor's indemnity obligations under this Paragraph 16.1.2 shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, the Construction Manager, the Architect, the Architect's consultants and agents and employees of any of them under any applicable statute, rule or regulation including the New York Statute, Occupational Safety and Hazardous Act, and the Federal Occupational Safety and Hazardous Act. In claims against any person or entity indemnified under this paragraph 16.1.2 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this paragraph 16.1.2 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

16.1.3 The Contractor shall indemnify and hold harmless: (1) the Owner, its consultants, employees, officers and agents; (2) the Construction Manager; and (3) the Architect and its consultants, employees, officers and agents, against any actions, lawsuits or proceedings or claims of liens brought against each or any of them as a result of liens filed against the Contractor's project funds, including all the cost and expense of said liens, and including but not limited to attorneys' fees incurred by each or any of them.

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

the Contractor.

- 16.1.5 The Contractor shall indemnify and hold harmless the Owner, the Construction Manager, and the Architect of and from any and all liability for claims made by third parties, including subcontractors, in connection with this Agreement and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

END OF SECTION



Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Florida UFSD

Kenneth Schupner, Architect
BBS Arch, Lndscpe Arch & Eng
244 East Main Street
Patchogue NY 11772

Schedule Year 2020 through 2021
Date Requested 12/01/2020
PRC# 2020011927

Location GH, SSI and SSM
Project ID#
Project Type District Wide Capital Improvements

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2020 through June 2021. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission; a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion [online](#).

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

There are very few exceptions to this rule. Complete information regarding these exceptions is available on the ["Request for a dispensation to work overtime" form \(PW30\)](#) and ["4 Day / 10 Hour Work Schedule" form \(PW 30.1\)](#).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid

or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment. Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), 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. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed \$100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds \$25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers' compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeymen in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyman's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of \$50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.



Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Florida UFSD

Kenneth Schupner, Architect
BBS Arch, Lndscpe Arch & Eng
244 East Main Street
Patchogue NY 11772

Schedule Year 2020 through 2021
Date Requested 12/01/2020
PRC# 2020011927

Location GH, SSI and SSM
Project ID#
Project Type District Wide Capital Improvements

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information

All information must be supplied

Federal Employer Identification Number: _____		
Name: _____		
Address: _____ _____		
City: _____	State: _____	Zip: _____
Amount of Contract: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to \$1,500 for a first offense and up to \$5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, www.labor.ny.gov. <https://labor.ny.gov/formsdocs/ui/IA999.pdf>

If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website www.labor.ny.gov or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

**To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND**

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.



Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor, **you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

- **Civil Penalty**
 - First offense: Up to \$2,500 per employee
 - Subsequent offense(s): Up to \$5,000 per employee
- **Criminal Penalty**
 - First offense: Misdemeanor - up to 30 days in jail, up to a \$25,000 fine and debarment from performing public work for up to one year.
 - Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a \$50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

Attention Employees

THIS IS A: **PUBLIC WORK PROJECT**

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at:
www.labor.ny.gov

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5156		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is \$250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.*)
- Training roster, attendance record or other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is \$3 million in Bronx, Kings, New York, Queens and, Richmond counties; \$1.5 million in Nassau, Suffolk and Westchester counties; and \$500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirements on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), 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.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Orange County General Construction

Boilermaker	12/01/2020
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JOB DESCRIPTION Boilermaker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour: 07/01/2020 01/01/2021

Boilermaker	\$ 61.24	\$63.38
Repairs & Renovations	61.24	63.38

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2020 01/01/2021

Boilermaker	32% of hourly	32% of hourly
Repair \$ Renovations	Wage Paid	Wage Paid
	+ \$ 25.35	+ TBA

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

Repairs & Renovation see (B,E,Q)

HOLIDAY

Paid: See (8, 16, 23, 24) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 12, 15, 16, 22, 23, 24, 25) on HOLIDAY PAGE

NOTE: *Employee must work in pay week to receive Holiday Pay.

**Employee gets 4 times the hourly wage rate for working Labor Day.

REGISTERED APPRENTICES

Wage per hour:

(1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

	07/01/2020	01/01/2021
Apprentice(s)	32% of Hourly	32% of Hourly
	Wage Paid Plus	Wage Paid Plus
	Amount Below	Amount Below

1st Term	\$ 19.38	\$ TBA
2nd Term	20.24	TBA
3rd Term	21.08	TBA
4th Term	21.94	TBA
5th Term	22.79	TBA
6th Term	23.65	TBA
7th Term	24.48	TBA

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter	12/01/2020
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JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange

WAGES

Per hour: 07/01/2020

Building:	
Millwright	\$ 44.25

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 40.46

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

HOLIDAY:

Paid: See (18,19) on HOLIDAY PAGE.

Paid: See (5,6,11,13,16,18,19,25) for 1st & 2nd yr.Apprentices

Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st	2nd	3rd	4th
\$23.81	\$28.14	\$32.47	\$41.13

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$27.50	\$30.08	\$32.94	\$37.17

8-740.2

Carpenter

12/01/2020

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Orange: : The territory west demarcated by a line drawn from the Bear Mountain Bridge continuing east to the Bear Mountain Circle. The territory south demarcated by a line continuing north on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W to the centerline of Route 32, The territories south and east heading north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Per hour: 07/01/2020

Carpet/Resilient

Floor Coverer \$ 33.15

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS

Per hour:

\$ 31.17

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Paid for 1st & 2nd yr.

Apprentices: See (5, 6, 11, 13, 16, 18, 19, 25)

Overtime: See (5, 6, 11, 13, 16, 18, 19, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wage per hour - (1) year terms:

1st	2nd	3rd	4th
\$13.23	\$16.35	\$21.03	\$25.71

Supplemental Benefits per hour - All apprentice terms:

\$ 23.86

8-2287D&O

Carpenter

12/01/2020

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour: 07/01/2020

Marine Construction:

Marine Diver \$ 70.80
Marine Tender 50.34

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 52.34

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year \$ 22.37
2nd year 27.97
3rd year 36.35
4th year 44.74

Supplemental Benefits

Per Hour:

All terms \$ 34.34

8-1456MC

Carpenter

12/01/2020

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES

Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.

Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.

Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES

Per hour: 07/01/2020 10/18/2020

Core Drilling:
Driller \$ 41.19 \$ 41.74

Driller Helper 32.62 32.92

Note: Hazardous Waste Pay Differential:

For Level C, an additional 10% above wage rate per hour

For Level B, an additional 10% above wage rate per hour

For Level A, an additional 10% above wage rate per hour

Note: When required to work on water: an additional \$ 0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Driller and Helper \$ 27.95

OVERTIME PAY

OVERTIME: See (B,E,K*,P,R**) on OVERTIME PAGE.

HOLIDAY

Paid: See (5,6) on HOLIDAY PAGE.
Overtime: * See (5,6) on HOLIDAY PAGE.
** See (8,10,11,13) on HOLIDAY PAGE.

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway

12/01/2020

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 2

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES

Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2020	07/01/2021 Additional
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	\$ 31.48	\$ 1.15

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 23.65

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

Notes:

When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. When a holiday falls upon a Sunday, it shall be observed on the following Monday.

An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
55%	60%	70%	80%

Supplemental Benefits per hour:

1st year term	\$ 11.80
2nd year term	11.80
3rd year term	14.45
4th year term	14.45

2-42AtSS

Carpenter - Building / Heavy&Highway

12/01/2020

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Orange, Sullivan, Ulster

WAGES

WAGES:(per hour)		
BUILDING/HEAVY&HIGHWAY/TUNNEL	07/01/2020	07/01/2021 Additional
Carpenter, Dockbuilder,	\$ 39.02	\$ 0.80

Piledriver, Dive Tender,
and Diver (Dry)

Diver (Wet) \$ 54.76

SHIFT DIFFERENTIAL: When mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

NOTE: Carpenters employed in the removal or abatement of asbestos or any toxic or hazardous material or required to work near asbestos or any toxic or hazardous material and required to wear protective equipment shall receive two (2) hours extra pay per day, plus applicable benefits.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 28.03

OVERTIME PAY

BUILDING:

See (B, E, Q) on OVERTIME PAGE.

HEAVY&HIGHWAY/TUNNEL:

See (B, E, P, *R, **T, X) on OVERTIME PAGE.

*R applies to Heavy&Highway/Tunnel Overtime Holiday Code 25 with benefits at straight time rate.

**T applies to Heavy&Highway/Tunnel Overtime Holiday Codes 5 & 6 with benefits at straight time rate.

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.

Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:

Paid: See (5, 6, 25) on HOLIDAY PAGE including benefits.

Overtime: See (5, 6, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

1 Year terms at the following wage rates.

Indentured after July 1 2016

1st	2nd	3rd	4th	5th
\$ 19.68	\$ 23.11	\$ 24.82	\$ 26.53	\$ 29.96

Indentured before July 1 2016

1st	2nd	3rd	4th
\$ 19.68	\$ 23.11	\$ 26.53	\$ 29.96

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.33

11-279.2B/H&H

Carpenter - Floor Coverer

12/01/2020

JOB DESCRIPTION Carpenter - Floor Coverer

DISTRICT 11

ENTIRE COUNTIES

Columbia, Sullivan, Ulster

PARTIAL COUNTIES

Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

WAGES:(per hour)

	07/01/2020	07/01/2021
		Additional
Carpet/Resilient Floor Coverer	\$ 39.02	\$ 0.80

SHIFT DIFFERENTIAL: When mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen (15) percent of wage plus applicable benefits.

NOTE: Carpenters employed in the removal or abatement of asbestos or any toxic or hazardous material or required to work near asbestos or any toxic or hazardous materials and required to wear protective equipment shall receive two (2) hours extra pay per day, plus applicable benefits.

SUPPLEMENTAL BENEFITS

Per hour:

Journey worker \$ 28.03

OVERTIME PAY

BUILDING:

See (B, E, Q) on OVERTIME PAGE.

HEAVY/HIGHWAY:

See (B, E, P, *R, **T , X) on OVERTIME PAGE.

*R applies to Heavy/Highway Overtime Holiday Code 25 with benefits at straight time rate.

**T applies to Heavy/Highway Overtime Holiday Codes 5 & 6 with benefits at straight time rate.

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.

Holidays that fall on Sunday will be observed Monday.

HEAVY/HIGHWAY:

Paid: See (5, 6, 25) on HOLIDAY PAGE including benefits.

Overtime: See (5, 6, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

1 Year terms at the following wage rates.

Indentured after July 1 2016

1st	2nd	3rd	4th	5th
\$ 19.68	\$ 23.11	\$ 24.82	\$ 26.53	\$ 29.96

Indentured before July 1 2016

1st	2nd	3rd	4th
\$ 19.68	\$ 23.11	\$ 26.53	\$ 29.96

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.33

11-279.2Floor

Electrician

12/01/2020

JOB DESCRIPTION Electrician

DISTRICT 11

ENTIRE COUNTIES

Orange, Putnam, Rockland

PARTIAL COUNTIES

Dutchess: Towns of Fishkill, East Fishkill, and Beacon.

WAGES

Per hour:

	07/01/2020	04/01/2021
Electrician Wireman/Technician	\$ 46.00	\$ 47.00

SHIFT DIFFERENTIAL: On Public Work in New York State when shift work is mandated either in the job specifications or by the contracting agency, the following rates apply:

Shift worked between 4:30pm & 12:30am	\$ 53.97	\$ 55.15
Shift worked between 12:30am & 8:30am	\$ 60.46	\$ 61.77

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (subject to overtime premiums):

- On jobs where employees are required to work from boatswain chairs, swinging scaffolds, etc., forty (40) feet or more above the ground, or under compressed air, using Scottair packs, gas masks or in shafts or tunnels, they shall receive an additional \$2.00 per hour above the regular straight time rate.

- Journeyman Wireman when performing welding or cable splicing: \$2.00 above the Journeyman Wireman rate of pay.

- Journeyman Wireman required to have a NYS Asbestos Certificate: \$2.00 above the Journeyman Wireman rate of pay.

- Journeyman Wireman required to have a CDL: \$2.00 above the Journeyman Wireman rate of pay.

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2020	04/01/2021
Journeyman	\$ 32.38 plus 3% of straight or premium wage	\$ 33.69 plus 3% of straight or premium wage

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 13, 15, 16, 25) on HOLIDAY PAGE

When the holiday falls on a Saturday it is observed the Friday before. When the holiday falls on a Sunday it is observed on the Monday after.

REGISTERED APPRENTICES

WAGES:

(1)year terms at the following rates

07/01/2020	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 13.20	\$ 17.60	\$ 22.00	\$ 26.40	\$ 30.80	\$ 33.00
2nd Shift	15.49	20.65	25.81	30.98	36.14	38.72
3rd Shift	17.35	23.13	28.91	34.70	40.48	43.47
04/01/2021	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 13.50	\$ 18.00	\$ 22.50	\$ 27.00	\$ 31.50	\$ 33.75
2nd Shift	15.84	21.12	26.40	31.68	36.96	39.60
3rd Shift	17.74	23.66	29.57	35.48	41.40	44.36

SUPPLEMENTAL BENEFITS per hour:

07/01/2020

1st term	\$ 14.92 plus 3% of straight or premium wage
2nd term	\$ 16.42 plus 3% of straight or premium wage
3rd term	\$ 18.42 plus 3% of straight or premium wage
4th term	\$ 19.92 plus 3% of straight or premium wage
5th & 6th term	\$ 21.92 plus 3% of straight or premium wage

09/01/2020

1st term	\$ 15.81 plus 3% of straight or premium wage
2nd term	\$ 16.31 plus 3% of straight or premium wage
3rd term	\$ 18.31 plus 3% of straight or premium wage
4th term	\$ 19.81 plus 3% of straight or premium wage
5th term	\$ 21.81 plus 3% of straight or premium wage
6th term	\$ 22.31 plus 3% of straight or premium wage

11-363/1

Elevator Constructor

12/01/2020

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford

Rockland: Only the Township of Stony Point.

Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2020	01/01/2021
Mechanic	\$ 60.49	\$62.51
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

Four (4), ten (10) hour days may be worked for New Construction and Modernization Work at straight time during a week, Monday thru Thursday or Tuesday thru Friday.

***Four (4), ten (10) hour days are not permitted for Contract Work/Repair Work

NOTE - In order to use the '4 Day/10 Hour Work Schedule' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule', form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2020	01/01/2021
Journeyman/Helper	\$ 34.765*	\$ 34.825*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 16) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour:

0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyman/Helper

1-138

Glazier

12/01/2020

JOB DESCRIPTION Glazier

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	7/01/2020	5/31/2021
		Additional
Glazier	\$ 57.55	\$ 2.00
*Scaffolding	58.55	
Glass Tinting & Window Film	29.17	
**Repair & Maintenance	29.17	

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 24' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$148,837. All Glass tinting, window film, regardless of material or intended use, and all affixing of decals to windows or glass.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2020
Journeyworker	\$ 34.59
Glass tinting & Window Film	20.29
Repair & Maintenance	20.29

OVERTIME PAY

See (B,H,V) on OVERTIME PAGE.

For 'Repair & Maintenance' and 'Glass Tinting & Window Film' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE

For 'Repair & Maintenance' and 'Glass Tinting & Window Film' Only

Paid: See(5, 6, 16, 25)
Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:

(1) year terms at the following wage rates:

7/01/2020

1st term	\$ 20.14
2nd term	28.21
3rd term	34.10
4th term	45.80

Supplemental Benefits:
(Per hour)

1st term	\$ 16.16
2nd term	22.76
3rd term	25.16
4th term	29.73

8-1087 (DC9 NYC)

Insulator - Heat & Frost

12/01/2020

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2020	05/31/2021
Insulator	\$ 55.00	\$ 2.00
Discomfort & Additional Training**	57.96	
Fire Stop Work*	29.44	

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring: garb or equipment worn against the body not customarily worn by insulators;psychological evaluation;special training, including but not limited to "Yellow Badge" radiation training

Note: Additional \$0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 34.35
Discomfort & Additional Training	36.30
Fire Stop Work: Journeyworker	17.52

OVERTIME PAY

See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.

*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES

(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
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\$ 29.44	\$ 34.55	\$ 39.66	\$ 44.78
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Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
\$ 30.99	\$ 36.41	\$ 41.83	\$ 47.26

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	\$ 17.52
2nd term	20.89
3rd term	24.25
4th term	27.61

Discomfort & Additional Training Apprentices:

1st term	\$ 18.50
2nd term	22.06
3rd term	25.62
4th term	29.18

8-91

Ironworker

12/01/2020

JOB DESCRIPTION Ironworker

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster

WAGES

Per hour:

07/01/2020

Structural	\$ 48.98
Reinforcing*	48.98
Ornamental	48.98
Chain Link Fence	48.98

*NOTE: For Reinforcing classification ONLY, Ironworker 4-46Reinf rates apply in Rockland County's southern section (south of Convent Road and east of Blue Hills Road).

On Government Mandated Irregular Work Days or Shift Work, the following wage will be paid:

1st Shift	\$ 48.98
2nd Shift	62.38
3rd Shift	66.85

**Note- Any shift that works past 12:00 midnight shall receive the 3rd shift differential.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 40.35
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OVERTIME PAY

See (B1, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16) on HOLIDAY PAGE

If a holiday falls on Saturday, it will be observed Friday. If a holiday falls on Sunday, it will be observed Monday.

REGISTERED APPRENTICES

Wages:

(1) year terms at the following wage:

	1st yr	2nd yr	3rd yr	4th yr
1st Shift	\$ 24.49	\$ 29.39	\$ 34.29	\$ 39.18
2nd Shift	33.35	39.16	44.97	50.76
3rd Shift	36.31	42.42	48.53	54.63

Supplemental Benefits per hour:

1st year	\$ 34.60
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2nd year	35.75
3rd year	36.90
4th year	38.05

11-417

Laborer - Building**12/01/2020**

JOB DESCRIPTION Laborer - Building**DISTRICT** 11**ENTIRE COUNTIES**

Orange, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Only the Townships of Andes, Bovina, Davenport, Delhi, Franklin, Hamden, Harpersfield, Kortright, Meredith, Middletown, Roxbury, and Stamford.

Greene: Only the Township of Catskill.

WAGES

GENERAL LABORER: flag person, portable generator tender, portable pump tender, temporary heat tender, chipping hammer, acoustic pump, mixer, concrete laborer, demolition, demo saw, gunite, general cleanup, landscaping, mason tender, jackhammer, pavement breaker, pressure blasting, signal person, buggies, wrecking, chain saw, vacuums, cutting torch, discharge pipe, mega mixer, pumpcrete machine.

INTERMEDIATE LABORER: excavation, grading, backfilling, tampers, walk behind roller, when OSHA or contractor requires negative respirator.

PREMIUM LABORER: Asbestos abatement work, toxic and hazardous abatement, lead abatement work, environmental work.

WAGES:(per hour)

	07/01/2020	06/01/2021	06/01/2022
General	\$ 37.20	\$ 38.25	\$ 39.30
Intermediate	39.00	40.10	41.20
Premium	41.85	43.00	44.20

These rates will cover all work within five feet of the building foundation line.

Shift Differential: On all Governmental mandated irregular or off shift work, an additional 25% of wage is required. The 25% shift differential will be paid on public works contract for shifts or irregular workdays outside the normal working hours for 2nd and 3rd shifts or irregular work day or when mandated or required by state, federal, county, local or other governmental agency contracts.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 29.93	\$ 30.95	\$ 32.00
Shift	36.70	37.97	39.28

OVERTIME PAY

See (B, E, E5, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

Holidays that fall on Saturday shall be observed on Friday, when holidays fall on Sunday they shall be observed on Monday.

REGISTERED APPRENTICES

1000 hour terms at the following wage rates:

1st term	\$ 20.46	\$ 21.04	\$ 21.62
2nd term	24.18	24.86	25.55
3rd term	27.90	28.69	29.48
4th term	31.62	32.51	33.41

Supplemental Benefits per hour:

Apprentices	\$ 24.83	\$ 25.85	\$ 26.90
Shift	30.17	31.44	32.75

11-17.BA

Laborer - Heavy&Highway**12/01/2020**

JOB DESCRIPTION Laborer - Heavy&Highway**DISTRICT** 11**ENTIRE COUNTIES**

Orange, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Only the Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Meredith, and Davenport.

Greene: Only the Township of Catskill.

WAGES

CLASS 1: Flagperson, gateperson.

CLASS 2: General laborer, chuck tender, nipper, powder carrier, magazine tender, concrete men, vibrator men, mason tender, mortar men, traffic control, custodial work, temporary heat, pump men, pit men, dump men, asphalt men, joint setter, signalman, pipe men, riprap, dry stone layers, jack hammer, bush hammer, pavement breaker, gunnite nozzle, men on mulching & seeding machines, all seeding & sod laying, landscape work, walk behind self-propelled power saws, grinder, groover, walk behind rollers and tampers of all types, burner men, filling and wiring of baskets for gabion walls, chain saw operator, railroad track laborers, power buggy & pumpcrete ops., plaster & acoustic pump, power brush cutter, retention liners, walk behind surface planer, chipping hammer, manhole, catch basin or inlet installing, mortar mixer, laser men. *Micropaving and crack sealing.

CLASS 3: Asbestos, toxic, bio remediation and phyto remediation, lead or hazardous materials abatement when certification or license is required, Drilling Equipment Only Where a Separate Air Compressor Unit Supplies Power.

CLASS 4: Asphalt screedman, blaster, all laborers involved in pipejacking and boring operations not exceeding more than 10 feet into pipe, boring or drilled area.

WAGES:(per hour)

07/01/2020

CLASS 1	\$ 35.25
CLASS 2	40.00
CLASS 3	44.25
CLASS 4	49.10

*NOTE: Micropaving and crack sealing laborers shall receive \$2.50 per hour over the CLASS 2 rate.

SHIFT DIFFERENTIAL: On all NYS D.O.T. or other Governmental mandated irregular or off shift work, an additional 15% of wage is required.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 29.75
Shift	33.81

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

Employees that work on a holiday which falls on a Saturday, shall be paid two and one-half (2-1/2) times the regular hourly rate for all hours worked on that day.

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

1000 hour terms at the following wage rates.

1st term	\$ 20.46
2nd term	24.18
3rd term	27.90
4th term	31.62

Supplemental Benefits per hour:

Apprentices	\$ 24.65
Shift	27.85

11-17.1H/H

Laborer - Tunnel

12/01/2020

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES

Chenango: Townships of Columbus, Sherburne and New Berlin.

Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES

Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2020	07/01/2021	07/01/2022
Class 1	\$ 50.45	\$ 51.95	\$ 53.45
Class 2	52.60	54.10	55.60
Class 4	59.00	60.50	62.00
Class 5	42.25	43.50	44.80

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional \$ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:

- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 32.15	\$ 33.25	\$ 34.45
Benefit 2	48.15	49.80	51.60
Benefit 3	64.15	66.35	68.75

Benefit 1 applies to straight time hours, paid holidays not worked.

Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.

Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES

FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician

12/01/2020

JOB DESCRIPTION Lineman Electrician

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Per hour:

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines

Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. (Ref #14.01.01)

07/01/2020

Lineman, Technician	\$ 53.50
Crane, Crawler Backhoe	53.50
Welder, Cable Splicer	53.50

Digging Mach. Operator	48.15
Tractor Trailer Driver	45.48
Groundman, Truck Driver	42.80
Equipment Mechanic	42.80
Flagman	32.10

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work". (Ref #14.02.01-A)

Lineman, Technician	\$ 53.50
Crane, Crawler Backhoe	53.50
Cable Splicer	58.85
Certified Welder -	
Pipe Type Cable	56.18
Digging Mach. Operator	48.15
Tractor Trailer Driver	45.48
Groundman, Truck Driver	42.80
Equipment Mechanic	42.80
Flagman	32.10

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates apply on switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. (Ref #14.02.01-B)

Lineman, Tech, Welder	\$ 54.82
Crane, Crawler Backhoe	54.82
Cable Splicer	60.30
Certified Welder -	
Pipe Type Cable	57.56
Digging Mach. Operator	49.34
Tractor Trailer Driver	46.60
Groundman, Truck Driver	43.86
Equipment Mechanic	43.86
Flagman	32.89

Additional \$1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. (Ref #14.03.01)

Lineman, Tech, Welder	\$ 56.01
Crane, Crawler Backhoe	56.01
Cable Splicer	56.01
Digging Mach. Operator	50.41
Tractor Trailer Driver	47.61
Groundman, Truck Driver	44.81
Equipment Mechanic	44.81
Flagman	33.61

Additional \$1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM to 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM to 1:00 AM REGULAR RATE PLUS 17.3 %
3RD SHIFT	12:30 AM to 9:00 AM REGULAR RATE PLUS 31.4 %

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (also required on non-worked holidays):

The following SUPPLEMENTAL BENEFITS apply to all classification categories of CONSTRUCTION, TRANSMISSION and DISTRIBUTION.

Journeyman \$ 24.90
*plus 6.75% of
hourly wage

*The 6.75% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman

6-1249a

Lineman Electrician - Teledata

12/01/2020

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

07/01/2020 01/01/2021

Cable Splicer	\$ 33.77	\$ 34.78
Installer, Repairman	\$ 32.05	\$ 33.01
Teledata Lineman	\$ 32.05	\$ 33.01
Tech., Equip. Operator	\$ 32.05	\$ 33.01
Groundman	\$ 16.99	\$ 17.50

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 5.06	\$ 5.06
	*plus 3% of	*plus 3% of
	wage paid	wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.

Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting

12/01/2020

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting

DISTRICT 6

ENTIRE COUNTIES

Columbia, Dutchess, Orange, Putnam, Rockland, Ulster

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.

(Ref #14.01.02)

Per hour: 07/01/2020

Lineman, Technician	\$ 47.48
Crane, Crawler Backhoe	47.48
Certified Welder	49.85
Digging Machine	42.73
Tractor Trailer Driver	40.36
Groundman, Truck Driver	37.98
Equipment Mechanic	37.98
Flagman	28.49

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

Tuesday thru Friday may be worked with no make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

Journeyman	\$ 24.90
	*plus 6.75% of

hourly wage

* The 6.75% is based on the hourly wage paid, straight time rate or premium rate.

Supplements paid at STRAIGHT TIME rate for holidays.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.

Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms.

	07/01/2020
1st term	\$ 28.49
2nd term	30.86
3rd term	33.24
4th term	35.61
5th term	37.98
6th term	40.36
7th term	42.73

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman

6-1249aReg8LT

Lineman Electrician - Tree Trimmer

12/01/2020

JOB DESCRIPTION Lineman Electrician - Tree Trimmer

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also would include stump removal near underground energized electrical lines, including telephone and CATV lines.

Per hour:	07/01/2020	01/03/21	01/02/22	01/01/23
Tree Trimmer	\$ 26.56	\$ 27.36	\$ 28.25	\$ 29.59
Equipment Operator	23.49	24.19	24.98	26.17
Equipment Mechanic	23.49	24.19	24.98	26.17
Truck Driver	19.56	20.15	20.80	21.79
Groundman	16.11	16.59	17.13	17.94
Flag person	11.80	12.50*	12.50	12.94

*RATE GOES INTO EFFECT 12/31/2020

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	\$ 9.98	\$ 9.98	\$ 10.23	\$ 10.48
Journeyman				
	*plus 3% of hourly wage	*plus 3% of hourly wage	*plus 3% of hourly wage	*plus 3% of hourly wage

* The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.

Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE
NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday.
All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building**12/01/2020**

JOB DESCRIPTION Mason - Building**DISTRICT** 11**ENTIRE COUNTIES**

Dutchess, Sullivan, Ulster

PARTIAL COUNTIES

Orange: Entire county except the Township of Tuxedo.

WAGES

Per hour:

07/01/2020

Bricklayer	\$ 41.31
Cement Mason	41.31
Plasterer/Stone Mason	41.31
Pointer/Caulker	41.31

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

Irregular work day requires 15% premium

Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 34.44

OVERTIME PAY

Cement Mason See (B, E, Q, W) on OVERTIME PAGE.

All Others See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5du-b

Mason - Building**12/01/2020**

JOB DESCRIPTION Mason - Building**DISTRICT** 9**ENTIRE COUNTIES**

Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour:

	07/01/2020	12/07/2020
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Building:

Tile, Marble,& Terrazzo Mechanic/Setter	\$54.63	\$ 55.32
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SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:	\$ 22.31* + \$7.50	\$ 22.41* + \$7.50
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* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE
Double time rate applies after 10 hours

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:
(Counties of Orange & Putnam)

750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
07/01/2020									
\$20.35	\$25.11	\$32.09	\$36.83	\$40.25	\$43.50	\$46.95	\$51.69	\$54.34	\$58.19

Supplemental Benefits per hour:
(Counties of Orange & Putnam)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$12.55*	\$12.55*	\$15.06*	\$15.06*	\$16.06*	\$17.56*	\$18.56*	\$18.56*	\$16.56*	\$21.81*
+\$0.66	+\$0.70	+\$0.80	+\$0.85	+\$1.23	+\$1.27	+\$1.62	+\$1.67	+\$5.82	+\$6.31

Wages per hour:
(Counties of Dutchess,Sullivan,Ulster)

750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
\$19.16	\$23.16	\$25.14	\$29.14	\$31.81	\$35.32	\$38.52	\$41.52	\$43.05	\$46.30

Supplemental Benefits per hour:
(Counties of Dutchess,Sullivan,Ulster)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$12.55*	\$12.55*	\$14.56*	\$14.56*	\$15.56*	\$16.06*	\$16.56*	\$17.56*	\$15.56*	\$20.31*
+\$0.64	+\$0.68	+\$0.73	+\$0.77	+\$1.14	+\$1.18	+\$1.52	+\$1.56	+\$6.08	+\$6.16

9-7/52B

Mason - Building	12/01/2020
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JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour:	07/01/2020	12/07/2020
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Building

Tile, Marble, &

Terrazzo Finisher

\$ 45.12

\$ 45.44

SUPPLEMENTAL BENEFITS

Journeyworker:

Per Hour

\$ 19.16*

\$ 19.51*

+ \$7.37

+ \$7.37

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY

See (A, *E, Q) on OVERTIME PAGE

Double time rate applies after 10 hours on Saturdays.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88B-tf

Mason - Building	12/01/2020
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JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

07/01/2020

Bricklayer

\$ 42.09

Cement Mason

42.09

Plasterer/Stone Mason

42.09

Pointer/Caulker

42.09

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

Irregular work day requires 15% premium

Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman

\$ 35.00

OVERTIME PAY

OVERTIME:

Cement Mason See (B, E, Q, W) on OVERTIME PAGE.

All Others See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

Mason - Building

12/01/2020

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Wages: 07/01/2020 01/14/2021

Additional

Marble Cutters & Setters \$ 60.35 \$0.95

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 37.24

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6751	6751-7500
07/01/2020									
\$24.15	\$27.15	\$30.16	\$33.19	\$36.20	\$39.20	\$42.15	\$45.26	\$51.28	\$57.34

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$20.14	\$21.58	\$23.02	\$24.42	\$25.85	\$27.29	\$28.72	\$30.12	\$32.98	\$35.81

9-7/4

Mason - Heavy&Highway

12/01/2020

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Sullivan, Ulster

PARTIAL COUNTIES

Orange: Entire county except the Township of Tuxedo.

WAGES

Per hour:

07/01/2020

Bricklayer	\$ 41.82
Cement Mason	41.82
Marble/Stone Mason	41.82
Plasterer	41.82
Pointer/Caulker	41.82

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

Irregular work day requires 15% premium

Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 34.43

OVERTIME PAY

Cement Mason See (B, E, Q, W, X)

All Others See (B, E, Q, X)

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5du-H/H

Mason - Heavy&Highway

12/01/2020

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

07/01/2020

Bricklayer	\$ 42.60
Cement Mason	42.60
Marble/Stone Mason	42.60
Plasterer	42.60
Pointer/Caulker	42.60

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

Irregular work day requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 34.99

OVERTIME PAY

Cement Mason See (B, E, Q, W, X)

All Others See (B, E, Q, X)

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building / Heavy&Highway

12/01/2020

JOB DESCRIPTION Operating Engineer - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Delaware, Orange, Rockland, Sullivan, Ulster

WAGES

CLASS A5: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with 140ft boom and over.

CLASS A4: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with 100ft to 139ft boom.

CLASS A3: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes with a boom under 100ft.

CLASS A2: Cranes, Derricks and Pile Drivers less than 100 tons with 140ft boom and over.

CLASS A1: Cranes, Derricks and Piler Drivers less than 100 tons with a 100ft to 139ft boom.

CLASS A: Cranes, Derricks and Pile Drivers less than 100 tons with a boom under 100ft.; Autograde Combn. Subgrader, Base Material Spreader and Base Trimmer (CMI and Similar Types); Autograde Pavement profiler (CMI and Similar Types); Autograde Pavement Profiler and Recycle type (CMI and Similar Type); Autograde Placer-Trimmed-Spreader Comb. (CMI & Similar types); Autograde Slipform Paver (CMI & Similar Types); Central Power Plants (all types); Chief of Party; Concrete Paving Machines; Drill (Baur, AMI and Similar Types); Drillmaster, Quarrymaster (Down the Hole Drill), Rotary Drill, Self-Propelled Hydraulic Drill, Self-Powered Drill; Draglines; Elevator Graders; Excavator; Front End Loaders (5 yds.and over); Gradalls; Grader-Rago; Helicopters (Co-Pilot); Helicopters (Communications Engineer);Juntann Pile Driver; Locomotive (Large); Mucking Machines; Pavement & Concrete Breaker, i.e., Superhammer & Hoe Ram; Roadway Surface Grinder; Prentice Truck; Scooper (Loader and Shovel); Shovels; Tree Chopper with Boom; Trench Machines (Cable Plow); Tunnel Boring Machine; Vacuum Truck

CLASS B: "A" Frame; Backhoe (Combination); Boom Attachment on Loaders (Rate based on size of Bucket) not applicable to Pipehook; Boring and Drilling Machines; Brush Chopper, Shredder and Tree Shearer; Bulldozer(Fine Grade); Cableways; Carryalls; Concrete Pump; Concrete Pumping System, Pump Concrete and Similar Types; Conveyors (125 ft. and over); Drill Doctor (duties incl. Dust Collector Maintenance); Front End Loaders (2 yds. but less than 5 yds.); Graders (Finish); Groove Cutting Machine (Ride on Type); Heater Planer; Hoists (all type Hoists, shall also include Steam, Gas, Diesel, Electric, Air Hydraulic, Single and Double Drum, Concrete, Brick Shaft Caisson, Snorkel Roof, and/or any other Similar Type Hoisting Machines, portable or stationary, except Chicago Boom Type); Long Boom Rate to be applied if Hoist is "Outside Material Tower Hoist***; Hydraulic Cranes-10 tons and under; Hydraulic Dredge; Hydro-Axe; Hydro Blaster; Jacks-Screw Air Hydraulic Power Operated Unit or Console Type (not hand Jack or Pile Load Test Type); Log Skidder; Pans; Pavers (all) concrete; Plate and Frame Filter Press; Pumpcrete Machines,Squeeze-crete & Concrete Pumping (regardless of size); Scrapers; Side Booms; "Straddle"Carrier-Ross and similar types; Winch Trucks (Hoisting); Whip Hammer

CLASS C: Asphalt Curbing Machine; Asphalt Plant Engineer; Asphalt Spreader; Autograde Tube Finisher and Texturing Machine (CMI & Similar types); Autograde Curecrete Machine (CMI & Similar Types); Autograde Curb Trimmer & Sidewalk, Shoulder, Slipform (CMI & Similar Types); Bar Bending Machines (Power); Batchers, Batching Plant and Crusher on Site; Belt Conveyor Systems; Boom Type Skimmer Machines; Bridge Deck Finisher; Bulldozer(except fine grade); Car Dumpers (Railroad); Compressor and Blower Type Units (used independently or mounted on dual purpose Trucks, on Job Site or in conjunction with jobsite, in Loading and Unloading of Concrete, Cement, Fly Ash, Instacrete, or Similar Type Materials); Compressors (2 or 3 in Battery); Concrete Finishing Machines; Concrete cleaning decontamination machine operator; Concrete Saws and Cutters (Ride-on type); Concrete Spreaders (Hetzl, Rexomatic and Similar Types); Concrete Vibrators; Conveyors (under 125 feet); Crushing Machines; Directional Boring Machines; Ditching Machine-small (Ditch-witch, Vermeer, or Similar type); Dope Pots (Mechanical with or without pump); Dumpsters; Elevator; Fireman; Fork Lifts (Economobile, Lull and Similar Types of Equipment); Front End Loaders (1 yd.and over but under 2 yds.); Generators (2 or 3 in Battery); Giraffe Grinders; Grout Pump; Gunnite Machines (excluding nozzle); Hammer Vibrator (in conjunction with Generator); Heavy Equipment Robotics Operator Technician; Hoists-Roof, Tugger, Aerial Platform Hoist & House Cars; Hoppers; Hopper Doors (power operated); Hydro Blaster; Hydraulic Jacking Trailer; Ladders (motorized); Laddervator; Locomotive-dinky type; Maintenance -Utility Man; Master Environmental Maintenance Technician; Mechanics; Mixers (Excepting Paving Mixers); Motor Patrols; Pavement Breakers (small self propelled ride on type-also maintains compressor hydraulic unit); Pavement Breaker-truck mounted; Pipe Bending Machine (Power); Pitch Pump; Plaster Pump (regardless of size); Post Hole Digger (Post Pounder & Auger); Rod Bending Machines (Power); Roller-Black Top; Scales (Power); Seaman pulverizing mixer; Shoulder widener; Silos; Skidsteer (all attachments); Skimmer Machines (boom-type); Steel Cutting Machine (service & maintain); Tam Rock Drill; Tractors; Transfer Machine; Captain (Power Boats); Tug Master (powerboats); Ultra High Pressure Waterjet Cutting Tool System operator/maintenance technician; Vacuum Blasting Machine; Vibrating Plants (used inconjunction with unloading); Welder and Repair Mechanics

CLASS D: Brooms and Sweepers; Chippers; Compressor (single); Concrete Spreaders (small type); Conveyor Loaders (not including Elevator Graders); Engines-large diesel (1620 HP) and Staging Pump; Farm Tractors; Fertilizing Equipment (Operation & Maint. of); Fine Grade Machine (small type); Form Line Graders (small type); Front End Loader (under 1 yard); Generator (single); Grease, Gas, Fuel and Oil supply trucks; Heaters (Nelson or other type incl. Propane, Natural Gas or Flowtype Units); Lights, Portable Generating Light Plants; Mixers (Concrete, small); Mulching Equipment (Operation and Maintenance of); Pumps (2 or less than 4 inch suction); Pumps (4 inch suction and over incl. submersible pumps); Pumps (Diesel Engine and Hydraulic-immaterial of power); Road Finishing Machines (small type); Rollers-grade, fill or stone base; Seeding Equip. (Operation and Maintenance of); Sprinkler & Water Pump Trucks (used on jobsite or in conjunction with jobsite); Steam Jennies and Boilers-irrespective of use; Stone Spreader; Tamping Machines, Vibrating Ride-on; Temporary Heating Plant (Nelson or other type, incl. Propane, Natural Gas or Flow Type Units); Water & Sprinkler Trucks (used on or in conjunction with jobsite); Welding Machines (Gas, Diesel, and/or Electric Converters of any type, single, two, or three in a battery); Wellpoint Systems (including installation by Bull Gang and Maintenance of)

CLASS E: Assistant Engineer/Oiler; Drillers Helper; Maintenance Apprentice (Deck Hand); Maintenance Apprentice (Oiler); Mechanics' Helper; Tire Repair and Maintenance; Transit/Instrument Man

WAGES:(per hour)

	07/01/2020	07/01/2021 Additional	07/01/2022 Additional
Class A5	\$ 61.32	\$ 2.30	\$ 2.25
Class A4	60.32		
Class A3	59.32		
Class A2	56.82		
Class A1	55.82		
Class A	54.82		
Class B	53.23		
Class C	51.32		
Class D	49.69		
Class E	47.98		
Safety Engineer	55.56		
**Outside Material Hoist (Class B) receives \$ 1.00 per hour on 110 feet up to 199 feet total height, \$ 2.00 per hour on 200 feet and over total height.			

Helicopter:	
Pilot/Engineer	56.64
Co Pilot	54.82
Communications Engineer	54.82

Surveying:	
Chief of Party	54.82
Transit/Instrument Man	47.98
Rod/Chainman	45.40
Additional \$0.75 for Survey work Tunnel under compressed air.	
Additional \$0.50 for Hydrographic work.	

- SHIFT WORK: On all Government mandated irregular or off shift work, an additional 15% on straight time hours.

- On HAZARDOUS WASTE REMOVAL or ASBESTOS REMOVAL work, or any state or federally DESIGNATED HAZARDOUS WASTE SITE:

For projects bid on or before April 1, 2020...Where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection, the Operating Engineer shall receive the hourly wage plus an additional twenty percent (20%) of that wage for the entire shift.

For projects bid after April 1, 2020...On hazardous waste removal work of any kind, including state or federally designated site where the operating engineer is required to wear level A, B, or C personal protection the operating engineer shall receive an hourly wage rate of his regular hourly wage plus \$5.00 per hour. An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus \$ 1.00 per hour. This shall also apply to sites where the level D personal protection is required.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 34.35

SHIFT WORK: On all Government mandated irregular or off shift work, an additional 15% on straight time hours.

OVERTIME PAY

See (B, E, Q, *V, X) on OVERTIME PAGE

*15% premium is also required on shift work benefits

HOLIDAY

Paid: See (5, 6, 10, 13, 15) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 13, 15) on HOLIDAY PAGE

Holidays falling on Sunday will be celebrated on Monday.

REGISTERED APPRENTICES

(1) year terms at the following percentage of journeyman's wage.

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour:

Apprentices \$ 34.35

11-825

Operating Engineer - Marine Dredging

12/01/2020

JOB DESCRIPTION Operating Engineer - Marine Dredging

DISTRICT 4

ENTIRE COUNTIES

Albany, Bronx, Cayuga, Chautauqua, Clinton, Columbia, Dutchess, Erie, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Niagara, Orange, Orleans, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES

These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2020	10/01/2020
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	\$ 40.31	\$ 41.42
CLASS A2 Crane Operator (360 swing)	35.92	36.91
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer,	34.86	35.82

Engineer, Chief Mate, Electrician,
Chief Welder, Maintenance Engineer
Licensed Boat, Crew Boat Operator

CLASS B2 Certified Welder	32.82	33.72
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	31.92	32.80
CLASS C2 Boat Operator	30.89	31.74
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	25.66	26.37

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	07/01/2020 \$11.58 plus 7.5% of straight time wage, Overtime hours add \$ 0.63	10/01/2020 \$11.98 plus 8% of straight time wage, Overtime hours add \$ 0.63
All Class C	\$11.28 plus 7.5% of straight time wage, Overtime hours add \$ 0.48	11.68 plus 8% of straight time wage, Overtime hours add \$ 0.48
All Class D	\$10.98 plus 7.5% of straight time wage, Overtime hours add \$ 0.33	11.38 plus 8% of straight time wage, Overtime hours add \$ 0.33

OVERTIME PAY

See (B2, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Steel Erectors	12/01/2020
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JOB DESCRIPTION Operating Engineer - Steel Erectors

DISTRICT 11

ENTIRE COUNTIES

Delaware, Orange, Rockland, Sullivan, Ulster

WAGES

CLASS A3: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with a 140 ft. boom and over.

CLASS A2: Cranes, Derricks and Pile Drivers 100 tons or more and Tower Cranes, with up to a 139 ft. boom and under.

CLASS A1: Cranes, Derricks and Pile Drivers less than 100 tons with a 140 ft. boom and over.

CLASS A: Cranes, Derricks and Pile Drivers less than 100 tons with up to a 139 ft. boom and under.

CLASS B: "A" Frame; Cherry Pickers(10 tons and under); Hoists (all type Hoists, shall also include Steam, Gas, Diesel, Electric, Air Hydraulic, Single and Double Drum, Concrete, Brick Shaft Caisson, Snorkel Roof, and/or any other Similar Type Hoisting Machines, portable or stationary, except Chicago Boom Type); Jacks-Screw Air Hydraulic Power Operated Unit or Console Type (not hand Jack or Pile Load Test Type); Side Booms; Straddle Carrier

CLASS C: Aerial Platform used as Hoist; Compressors (2 or 3 in Battery); Concrete cleaning/ decontamination machine operator; Directional Boring Machines; Elevator or House Cars; Conveyers and Tugger Hoists; Fireman; Fork Lifts; Generators (2 or 3 in Battery); Heavy Equipment Robotics Operator/Technician; Master Environmental Maintenance Technician; Maintenance -Utility Man; Rod Bending Machines (Power); Captain(powerboat); Tug Master; Ultra High Pressure Waterjet Cutting Tool System; Vacuum Blasting Machine; Welding Machines(gas or electric,2 or 3 in battery, including diesels); Transfer Machine; Apprentice Engineer/Oiler with either one compressor or one welding machine when used for decontamination and remediation

CLASS D: Compressor (single); Welding Machines (Gas, Diesel, and/or Electric Converters of any type); Welding System Multiple (Rectifier Transformer type)

CLASS E: Assistant Engineer/Oiler; Maintenance Apprentice (Deck Hand);Drillers Helper; Maintenance Apprentice (Oiler); Mechanics' Helper; Transit/Instrument Man

WAGES:(per hour)

	07/01/2020	07/01/2021 Additional	07/01/2022 Additional
Class A3	\$ 63.34	\$ 2.30	\$ 2.25
Class A2	61.68		
Class A1	58.84		
Class A	57.18		
Class B	54.39		
Class C	51.73		
Class D	50.20		
Class E	48.44		
Vacuum Truck	55.15		
Safety Engineer	56.01		

Helicopter:

Pilot/Engineer	58.84
Co Pilot	58.45
Communications Engineer	58.45

Surveying:

Chief of Party	55.15
Transit/Instrument man	48.44
Rod/Chainman	45.40

Additional \$0.75 for Survey work Tunnels under compressed air.

Additional \$0.50 for Hydrographic work.

- SHIFT WORK: On all Government mandated irregular or off shift work, an additional 15% on straight time hours.

- On HAZARDOUS WASTE REMOVAL or ASBESTOS REMOVAL work, or any state or federally DESIGNATED HAZARDOUS WASTE SITE:

For projects bid on or before April 1, 2020...Where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection, the Operating Engineer shall receive the hourly wage plus an additional twenty percent (20%) of that wage for the entire shift.

For projects bid after April 1, 2020...On hazardous waste removal work of any kind, including state or federally designated site where the operating engineer is required to wear level A, B, or C personal protection the operating engineer shall receive an hourly wage rate of his regular hourly wage plus \$5.00 per hour. An operating engineer working at a hazardous waste removal project or site at a task requiring hazardous waste related certification, but who is not working in a zone requiring level A, B, or C personal protection, shall receive an hourly wage rate of his regular rate plus \$ 1.00 per hour. This shall also apply to sites where the level D personal protection is required.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 34.35
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OVERTIME PAY

See (B, E, Q, *V, X) on OVERTIME PAGE

*15% premium is also required on shift work benefits

HOLIDAY

Paid: See (5, 6, 10, 13, 15) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 13, 15) on HOLIDAY PAGE

Holidays falling on Sunday will be celebrated on Monday.

REGISTERED APPRENTICES

(1) year terms at the following percentage of journeyman's wage.

1st	2nd	3rd	4th
60%	70%	80%	90%

Supplemental Benefits per hour:

Apprentices \$ 34.45

11-825SE

Painter	12/01/2020
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JOB DESCRIPTION Painter

DISTRICT 1

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Sullivan, Ulster

WAGES

Per hour

07/01/2020

Brush/Paper Hanger	\$ 35.14
Dry Wall Finisher	35.14
Lead Abatement	35.14
Sandblaster-Painter	35.14
Spray Rate	36.14

See Bridge Painting rates for the following work:

Structural Steel , all work performed on tanks, ALL BRIDGES, towers, smoke stacks, flag poles. Rate shall apply to all of said areas from the ground up.

SUPPLEMENTAL BENEFITS

Per hour

Journey person \$ 24.04

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED SHIFT(S) OR SINGULAR IRREGULAR SHIFT OF AT LEAST A FIVE (5) DAY DURATION (MONDAY THROUGH FRIDAY), WHEN THE SHIFT STARTS BETWEEN THE HOURS LISTED BELOW:

4:00 PM to 6:30 AM REGULAR RATE PLUS 15%**

OVERTIME ON MULTIPLE SHIFT WORK AND SINGULAR IRREGULAR SHIFT THE SHIFT RATE IS THE BASE RATE

**SHIFT RATE STOPS AFTER 6:30AM

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour

Six (6) month terms at the following percentage of Journey person's wage

1st	2nd	3rd	4th	5th	6th
40%	50%	60%	70%	80%	90%

Supplemental Benefits per hour worked

1st term \$ 10.64
All others 24.04

1-155

Painter - Bridge & Structural Steel	12/01/2020
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JOB DESCRIPTION Painter - Bridge & Structural Steel

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per Hour:

STEEL:

Bridge Painting:	07/01/2020	10/01/2020	10/01/2021
	\$ 50.25	\$ 51.50	\$ 53.00
	+ 7.88*	+ 8.63*	+ 9.63*

ADDITIONAL \$6.00 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:	07/01/2020	10/01/2020	10/01/2021
	\$ 10.20	\$ 10.90	\$ 10.90
	+ 29.65*	+ 30.00*	+ 30.60*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage - Per hour:

Apprentices: (1) year terms

	07/01/2020	10/01/2020	10/01/2021
1st year	\$ 20.10	\$ 20.60	\$ 21.20
	+ 3.15*	+ 3.45*	+ 3.86*
2nd year	\$ 30.15	\$ 30.90	\$ 31.80
	+ 4.73*	+ 5.18*	+ 5.78*
3rd year	\$ 40.20	\$ 41.20	\$ 42.40
	+ 6.30*	+ 6.90*	+ 7.71*
Supplemental Benefits - Per hour:			
1st year	\$.25	\$.25	\$.25
	+ 11.86*	+ 12.00*	+ 12.24*
2nd year	\$ 10.20	\$ 10.90	\$ 10.90
	+ 17.79*	+ 18.00*	+ 18.36*
3rd year	\$ 10.20	\$ 10.90	\$ 10.90
	+ 23.72*	+ 24.00*	+ 24.48*

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping	12/01/2020
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JOB DESCRIPTION Painter - Line Striping

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per hour:

	07/01/2020	07/01/2021	07/01/2022
Painter (Striping-Highway):			
Striping-Machine Operator*	\$ 30.10	\$ 30.32	\$ 31.53
Linerman Thermoplastic	\$ 36.53	\$ 36.93	\$ 38.34

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour paid:	07/01/2020	07/01/2021	07/01/2022
Journeyworker:			
Striping Machine Operator:	\$ 9.16	\$ 10.03	\$ 10.03
Linerman Thermoplastic:	\$ 9.16	\$ 10.03	\$ 10.03

OVERTIME PAY

See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rates:

	07/01/2020	12/31/2020
1st Term:	\$ 12.04	\$ 12.50
2nd Term:	\$ 18.06	\$ 18.19
3rd Term:	\$ 24.08	\$ 24.26

Supplemental Benefits per hour:

1st term:	\$ 9.16	\$ 10.03
2nd Term:	\$ 9.16	\$ 10.03
3rd Term:	\$ 9.16	\$ 10.03

8-1456-LS

Painter - Metal Polisher	12/01/2020
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JOB DESCRIPTION Painter - Metal Polisher

DISTRICT 8

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuylar, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2020
Metal Polisher	\$ 36.33
Metal Polisher*	37.43
Metal Polisher**	40.33

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2020
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Journeyworker:	
All classification	\$ 9.94

OVERTIME PAY

See (B, E, P, T) on OVERTIME PAGE

HOLIDAY

Paid:	See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime:	See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

	07/01/2020
1st year	\$ 16.00
2nd year	17.00
3rd year	18.00
1st year*	\$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	\$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:	
1st year	\$ 6.69
2nd year	6.69
3rd year	6.69

8-8A/28A-MP

Plumber

12/01/2020

JOB DESCRIPTION Plumber

DISTRICT 11

ENTIRE COUNTIES

Orange, Rockland, Sullivan

PARTIAL COUNTIES

Ulster: Only the Townships of Plattekill, Marlboro, Wawarsing, and Shawangunk (except for Wallkill and Shawangunk Prisons).

WAGES

REFRIGERATION: For commercial and industrial refrigeration which means service, maintenance, and installation work where the combined compressor tonnage does not exceed 40 tons.

AIR CONDITIONING: Air conditioning to be installed that is water cooled shall not exceed 25 tons. This will include the piping of the component system and erection of water tower. Air conditioning that is air cooled shall not exceed 50 tons.

WAGES: (per hour)

	07/01/2020	05/01/2021
		Additional
Plumber	\$ 34.59	\$ 2.00

Star Certification: an additional \$ 1.00 per hour over scale will be paid to all those who have Star Certification.

Shift Differential: When mandated by the governmental agency, an additional 15% premium will be paid for irregular work day or for 2nd and 3rd shift.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman

\$ 33.07*

*For overtime or shift differential work, \$0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

OVERTIME PAY

See (B, G, P, *V) on OVERTIME PAGE

* A portion of the benefit amount is subject to the V code for overtime and shift differential work.

HOLIDAY

Paid: See (5, 6, 13, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 13, 15, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1)year terms at the following wage.

07/01/2020

1st term	\$ 12.11
2nd term	15.57
3rd term	19.03
4th term	22.49
5th term	27.68

Supplemental Benefits per hour:

Apprentices

1st term	\$ 11.66*
2nd term	14.96*
3rd term	18.25*
4th term	21.55*
5th term	26.49*

*For overtime or shift differential work, \$0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

11-373 Refrig

Plumber

12/01/2020

JOB DESCRIPTION Plumber

DISTRICT 11

ENTIRE COUNTIES

Orange, Rockland, Sullivan

PARTIAL COUNTIES

Ulster: Only the Townships of Plattekill, Marlboro, Wawarsing, and Shawangunk (except for Wallkill and Shawangunk Prisons).

WAGES

WAGES:(per hour)	07/01/2020	05/01/2021
		Additional
Plumber/Steamfitter	\$ 46.70	\$ 2.50

Note: For all work 40-60 feet above ground add \$ 0.25 per hour, over 60 feet add \$ 0.50 per hour.

Shift Differential: When mandated by the governmental agency, an additional 15% premium will be paid for irregular work day or for 2nd and 3rd shift.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman

\$ 40.82*

*For overtime or shift differential work, \$0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

OVERTIME PAY

See (B, E, Q, *V) on OVERTIME PAGE

* A portion of the benefit amount is subject to the V code for overtime and shift differential work.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

When a holiday falls on a Saturday, the day prior shall be considered and recognized as the holiday. When a holiday falls on a Sunday, the day proceeding shall be considered and recognized as the holiday to be observed.

REGISTERED APPRENTICES

(1) year terms at the following wages.

	07/01/2020
1st term	\$ 16.35
2nd term	21.02
3rd term	25.69
4th term	30.36
5th term	37.36

Supplemental Benefits per hour:

1st term	\$ 14.37*
2nd term	18.44*
3rd term	22.50*
4th term	26.58*
5th term	32.67*

*For overtime or shift differential work, \$0.10 is paid at straight time, the remaining balance is paid at the same premium as the wages.

11-373 SF

Roofer	12/01/2020
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JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour: 07/01/2020

Roofer/Waterproofer	\$ 44.25
	+ \$7.00*

* This portion is not subject to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS

Per Hour: \$ 27.87

OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term

	1st	2nd	3rd	4th
	\$ 15.49	\$ 22.13	\$ 26.55	\$ 33.19
		+ 3.00*	+ 4.20*	+ 5.26*
Supplements:				
	1st	2nd	3rd	4th
	\$ 3.57	\$ 14.10	\$ 16.85	\$ 20.98

9-8R

Sheetmetal Worker	12/01/2020
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JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2020
SheetMetal Worker	\$ 43.65
	+ 3.27*

*This portion is not subject to overtime premiums.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker \$ 42.55

OVERTIME PAY

OVERTIME: See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 16.16	\$ 18.18	\$ 20.21	\$ 22.23	\$ 24.24	\$ 26.27	\$ 28.77	\$ 31.27
+ 1.31*	+ 1.47*	+ 1.64*	+ 1.80*	+ 1.96*	+ 2.13*	+ 2.29*	+ 2.45*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 18.31
2nd term	20.60
3rd term	22.88
4th term	25.19
5th term	27.47
6th term	29.75
7th term	31.56
8th term	33.39

8-38

Sprinkler Fitter

12/01/2020

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour

07/01/2020

Sprinkler \$ 45.52
Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journeyperson \$ 27.57

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES

Wages per hour

One Half Year terms at the following percentage of journeyperson's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 21.97	\$ 24.41	\$ 26.59	\$ 29.02	\$ 31.45	\$ 33.88	\$ 36.31	\$ 38.74	\$ 41.17	\$ 43.60

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.27	\$ 8.27	\$ 18.70	\$ 18.70	\$ 18.95	\$ 18.95	\$ 18.95	\$ 18.95	\$ 18.95	\$ 18.95

1-669.2

Teamster - Building / Heavy&Highway

12/01/2020

JOB DESCRIPTION Teamster - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Orange, Rockland, Sullivan, Ulster

WAGES

GROUP 1: LeTourneau Tractors, Double Barrel Euclids, Athney Wagons and similar equipment (except when hooked to scrapers), I-Beam and Pole Trailers, Tire Trucks, Tractor and Trailers with 5 axles and over, Articulated Back Dumps and Road Oil Distributors, Articulated Water Trucks and Fuel Trucks/Trailers, positions requiring a HAZMAT CDL endorsement.

GROUP 1A: Drivers on detachable Gooseneck Low Bed Trailers rated over 35 tons.

GROUP 2: All equipment 25 yards and up to and including 30 yard bodies and cable Dump Trailers and Powder and Dynamite Trucks.

GROUP 3: All Equipment up to and including 24-yard bodies, Mixer Trucks, Dump Crete Trucks and similar types of equipment, Fuel Trucks, Batch Trucks and all other Tractor Trailers, Hi-Rail Truck.

GROUP 4: Tri-Axles, Ten Wheelers, Grease Trucks, Tillerman, Pattern Trucks, Attenuator Trucks. Water Trucks, Bus.

GROUP 5: Straight Trucks.

GROUP 6: Pick-up Trucks for hauling materials and parts, and Escort Man over-the-road.

WAGES: (per hour) 07/01/2020

GROUP 1	\$ 33.25
GROUP 1A	34.39
GROUP 2	32.69
GROUP 3	32.47
GROUP 4	32.36
GROUP 5	32.24
GROUP 6	32.24

NOTE ADDITIONAL PREMIUMS:

- On projects requiring an irregular shift a premium of 10% will be paid on wages. The premium will be paid for off-shift or irregular shift work when mandated by Governmental Agency.

- Employees engaged in hazardous/toxic waste removal, on a State or Federally designated hazardous/toxic waste site, where the employee comes in contact with hazardous/toxic waste material and when personal protective equipment is required for respiratory, skin, or eye protection, the employee shall receive an additional 20% premium above the hourly wage.

SUPPLEMENTAL BENEFITS

Per hour:

First 40 hours	\$ 35.55
Over 40 hours	28.75

OVERTIME PAY

See (*B, E, **P, X) on OVERTIME PAGE

*Holidays worked Monday through Friday receive Double Time (2x) after 8 hours.

**Sunday Holidays are paid at a rate of double time and one half (2.5x) for all hours worked.

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (*1) on HOLIDAY PAGE

*See OVERTIME PAY section for when additional premium is applicable on Holiday hours worked.

11-445B/HH

Welder

12/01/2020

JOB DESCRIPTION Welder

DISTRICT 1

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour 07/01/2020

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

- (AA) Time and one half of the hourly rate after 7 and one half hours per day
- (A) Time and one half of the hourly rate after 7 hours per day
- (B) Time and one half of the hourly rate after 8 hours per day
- (B1) Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday.
Double the hourly rate for all additional hours
- (B2) Time and one half of the hourly rate after 40 hours per week
- (C) Double the hourly rate after 7 hours per day
- (C1) Double the hourly rate after 7 and one half hours per day
- (D) Double the hourly rate after 8 hours per day
- (D1) Double the hourly rate after 9 hours per day
- (E) Time and one half of the hourly rate on Saturday
- (E1) Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
- (E2) Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E3) Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
- (E4) Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E5) Double time after 8 hours on Saturdays
- (F) Time and one half of the hourly rate on Saturday and Sunday
- (G) Time and one half of the hourly rate on Saturday and Holidays
- (H) Time and one half of the hourly rate on Saturday, Sunday, and Holidays
- (I) Time and one half of the hourly rate on Sunday
- (J) Time and one half of the hourly rate on Sunday and Holidays
- (K) Time and one half of the hourly rate on Holidays
- (L) Double the hourly rate on Saturday
- (M) Double the hourly rate on Saturday and Sunday
- (N) Double the hourly rate on Saturday and Holidays
- (O) Double the hourly rate on Saturday, Sunday, and Holidays
- (P) Double the hourly rate on Sunday
- (Q) Double the hourly rate on Sunday and Holidays
- (R) Double the hourly rate on Holidays
- (S) Two and one half times the hourly rate for Holidays

- (S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
- (T) Triple the hourly rate for Holidays
- (U) Four times the hourly rate for Holidays
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.
- (X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

- (1) None
- (2) Labor Day
- (3) Memorial Day and Labor Day
- (4) Memorial Day and July 4th
- (5) Memorial Day, July 4th, and Labor Day
- (6) New Year's, Thanksgiving, and Christmas
- (7) Lincoln's Birthday, Washington's Birthday, and Veterans Day
- (8) Good Friday
- (9) Lincoln's Birthday
- (10) Washington's Birthday
- (11) Columbus Day
- (12) Election Day
- (13) Presidential Election Day
- (14) 1/2 Day on Presidential Election Day
- (15) Veterans Day
- (16) Day after Thanksgiving
- (17) July 4th
- (18) 1/2 Day before Christmas
- (19) 1/2 Day before New Years
- (20) Thanksgiving
- (21) New Year's Day
- (22) Christmas
- (23) Day before Christmas
- (24) Day before New Year's
- (25) Presidents' Day
- (26) Martin Luther King, Jr. Day
- (27) Memorial Day
- (28) Easter Sunday



New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12240

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By:

(Check Only One)

☐

Contracting Agency

☐

Architect or Engineering Firm

☐

Public Work District Office

Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone: ()

Fax: ()

E-Mail:

2. NY State Units (see Item 5)

☐ 01 DOT

☐ 02 OGS

☐ 03 Dormitory Authority

☐ 04 State University
Construction Fund

☐ 05 Mental Hygiene
Facilities Corp.

☐ 06 OTHER N.Y. STATE UNIT

☐ 07 City

☐ 08 Local School District

☐ 09 Special Local District, i.e.,
Fire, Sewer, Water District

☐ 10 Village

☐ 11 Town

☐ 12 County

☐ 13 Other Non-N.Y. State
(Describe)

3. SEND REPLY TO ☐ (check if new or change)
Name and complete address:

Telephone:()

Fax: ()

E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

☐ New Schedule of Wages and Supplements.

APPROXIMATE BID DATE :

☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR
THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding?

YES ☐ NO ☐

10. Name and Title of Requester

Signature



NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

**LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE
AWARDED ANY PUBLIC WORK CONTRACT**

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: <https://applications.labor.ny.gov/EDList/searchPage.do>

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 11/13/2020

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	NYC	*****9839	A.J.S. PROJECT MANAGEMENT, INC.		149 FIFTH AVENUE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC	*****6775	ADVENTURE MASONRY CORP.		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC		AGOSTINHO TOME		405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	DOL		AJ TORCHIA		10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	DOL		AMADEO J TORCHIA	TORCHIA'S HOME IMPROVEMENT	10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	NYC		AMJAD NAZIR		2366 61ST ST BROOKLYN NY 11204	12/15/2016	12/15/2021
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	NYC		ANTHONY J SCLAFANI		149 FIFTH AVE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL		ANTHONY PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10323	01/23/2017	01/23/2022
DOL	DOL		ANTONIO ESTIVEZ		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DOL		ARVINDER ATWAL		65 KENNETH PLACE NEW HYDE PARK NY 11040	07/19/2017	07/19/2022
DOL	NYC	*****6683	ATLAS RESTORATION CORP.		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	NYC	*****5532	ATWAL MECHANICALS, INC		65 KENNETH PLACE NEW HYDE PARK NY 11040	07/19/2017	07/19/2022
DOL	NYC	*****2591	AVI 212 INC.		260 CROPSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	AG		AVTAR SINGH		116-24 127TH STREET SOUTH OZONE PARK NY 11420	12/22/2015	12/22/2020
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	AG		BALDEV SINGH		116-24 127TH STREET SOUTH OZONE PARK NY 11420	12/22/2015	12/22/2020
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****3915	BEACON RESTORATION INC		SUITE B-8 782 PELHAM PARKWAY SOUTHBRONX NY 10462	04/21/2016	04/21/2021
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BIAGIO CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****8551	BRANDY'S MASONRY		216 WESTBROOK STREET P O BOX 304SAYRE PA 18840	08/09/2016	08/09/2021
DOL	DOL	*****1449	BRRESTORATION NY INC		140 ARCADIA AVENUE OSWEGO NY 13126	09/12/2016	09/12/2021
DOL	DOL		BRUCE MORSEY		C/O KENT HOLLOW SIDING LL 29A BRIDGE STREETNEW MILFORD CT 06776	01/15/2016	01/15/2021

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DOL	DOL		BRUCE P. NASH JR.		5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****0225	C&D LAFACE CONSTRUCTION, INC.		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****8809	C.B.E. CONTRACTING CORPORATION		310 MCGUINESS BLVD GREENPOINT NY 11222	03/07/2017	03/07/2022
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL		CANTISANI & ASSOCIATES LTD		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CANTISANI HOLDING LLC			06/12/2018	06/12/2023
DOL	DOL		CARIBBEAN POOLS		C/O DOUGLAS L MALARKEY 64 VICTORIA DRIVEBINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL		CARMEN RACHETTA		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	02/03/2025
DOL	DOL		CARMENA RACHETTA		8531 OSWEGO ROAD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****3812	CARMODY "2" INC			06/12/2018	06/12/2023
DOL	DOL	*****1143	CARMODY BUILDING CORP	CARMODY CONTRACTIN G AND CARMODY CONTRACTIN G CORP.	442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY CONCRETE CORPORATION			06/12/2018	06/12/2023
DOL	DOL		CARMODY ENTERPRISES, LTD.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY INC		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3812	CARMODY INDUSTRIES INC			06/12/2018	06/12/2023
DOL	DOL		CARMODY MAINTENANCE CORPORATION		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY MASONRY CORP		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****8809	CBE CONTRACTING CORP		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	AG		CESAR J. AGUDELO		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL	*****7655	CHAMPION CONSTRUCTION SERVICES CORP		2131 SCHENECTADY AVENUE BROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL		CHARLES ZIMMER JR		216 WESTBROOK STREET P O BOX 304SAYRE PA 18840	08/09/2016	08/09/2021
DOL	DOL		CHRISTINE J HEARNE		C/O CJ-HEARNE CONSTRUCTIO 131 PONCE DE LEON AVE NEATLANTA GA 30308	12/01/2015	12/01/2020
DOL	DOL		CHRISTOPHER J MAINI		19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****0671	CJ-HEARNE CONSTRUCTION CO		SUITE 204 131 PONCE DE LEON AVENUEATLANTA GA 30308	12/01/2015	12/01/2020
DOL	DOL	*****1927	CONSTRUCTION PARTS WAREHOUSE, INC.	CPW	5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	NYC	*****2164	CREATIVE TRUCKING INC		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL	*****7761	D L MALARKEY CONSTRUCTION		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****7888	D L MALARKEY CONSTRUCTION INC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****5629	DAKA PLUMBING AND HEATING LLC		2561 ROUTE 55 POUGHQUAG NY 12570	02/19/2016	02/19/2021

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DOL	NYC		DALJIT KAUR BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL		DANICA IVANOSKI		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		DAVID MARTINEZ		C/O EMPIRE TILE INC 6 TREMONT COURTHUNTINGTON STATION NY 11746	03/08/2016	03/08/2021
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DEBBIE STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	AG		DEBRA MARTINEZ		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL		DEDA GAZIVODAN		C/O DAKA PLUMBING AND H 2561 ROUTE 55POUGHQUAG NY 12570	02/19/2016	02/19/2021
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		DENNIS SCHWANDTNER		C/O YES SERVICE AND REPAIR 145 LODGE AVEHUNTINGTON STATION NY 11476	08/09/2016	08/09/2021
DOL	DOL		DF CONTRACTORS OF ROCHESTER, INC.		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL		DF CONTRACTORS, INC.		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	NYC		DIMITRIOS TSOUMAS		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	DOL		DOMENICO LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****3242	DONALD R. FORSAY	DF LAWN SERVICE	1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	DOL		DONALD R. FORSAY		1835 DAANSEN RD. PALMYRA NY 14522	05/16/2017	05/16/2022
DOL	NYC	*****7404	DOSANJH CONSTRUCTION CORP		9439 212TH STREET QUEENS VILLAGE NY 11428	02/25/2016	02/25/2021
DOL	DOL		DOUGLAS L MALARKEY	MALARKEY CONSTRUCTION	64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	NYC		DUARTE LOPES		66-05 WOODHAVEN BLVD. STE 2REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL		EAST COAST PAVING		2238 BAKER RD GILLETTE PA 16923	03/12/2018	03/12/2023
DOL	NYC	*****4269	EAST PORT EXCAVATION & UTILITIES		601 PORTION RD RONKONKOMA NY 11779	11/18/2016	11/18/2021
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	DOL	*****3270	EMPIRE TILE INC		6 TREMONT COURT HUNTINGTON STATION NY 11746	03/08/2016	03/08/2021
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL	*****7403	F & B PAINTING CONTRACTING INC		2 PARKVIEW AVENUE HARRISON NY 10604	09/26/2016	09/26/2021
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		FAY MATTHEW		C/O CHAMPION CONSTRUCTION 2131 SCHENECTADY AVENUEBROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL		FAZIA GINA ALI-MOHAMMED	C/O CHAMPION CONSTRUCTION	2131 SCHENECTADY AVENUE BROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	DOL		FRANK BENEDETTO		19 CATLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023

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DOL	DOL		FRANK BENEDETTO		C/O F & B PAINTING CONTRA 2 PARKVIEW AVENUEHARRISON NY 10604	09/26/2016	09/26/2021
DOL	DOL	*****4722	FRANK BENEDETTO AND CHRISTOPHER J MAINI	B & M CONCRETE	19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	NYC		FRANK MAINI		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	DOL		GALINDA ROTENBERG		C/O GMDV TRANS INC 67-48 182ND STREETFRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	DOL		GEOFF CORLETT		415 FLAGGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		GIOVANNI LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	NYC	*****3164	GLOBE GATES INC	GLOBAL OVERHEAD DOORS	405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	DOL	*****5674	GMDV TRANS INC		67-48 182ND STREET FRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	NYC		GREAT ESTATE CONSTRUCTION, INC.		327 STAGG ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	DOL		GREGORY S. OLSON		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC		HARMEL SINGH		15 CLINTON LANE HICKSVILLE NY 11801	02/25/2016	02/25/2021
DOL	NYC		HAROLD KUEMMEL		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	NYC	*****3228	HEIGHTS ELEVATOR CORP.		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DOL		HENRY VAN DALRYMPLE		2663 LANTERN LANE ATLANTA GA 30349	12/01/2015	12/01/2020
DOL	DOL	*****8282	IDEMA DEVELOPMENT INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL	*****8282	IDEMA GENERAL CONTRACTORS INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL	*****7001	INTEGRATED CONSTRUCTION & POWER SYSTEMS INC		SUITE 100 2105 W GENESEE STREETSYRACUSE NY 13219	01/06/2016	01/06/2021
DOL	DOL	*****5131	INTEGRITY MASONRY, INC.	M&R CONCRETE	722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	AG		J A M CONSTRUCTION CORP		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	DOL		J.A. HIRES CADWALLADER		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JAMES B RHYNDERS		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL		JAMES C. DELGIACCO		722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		JAMES E RHYNDERS		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	AG		JAMES FALCONE		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	DOL		JAMES LIACONE		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JAMES RACHEL		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023

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DOL	DOL		JAMES RHYNDERS SR		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL		JASON W MILLIMAN		C/O ROCHESTER ACOUSTICAL P O BOX 799HILTON NY 14468	02/19/2016	02/19/2021
DOL	DOL	*****5368	JCH MASONRY & LANDSCAPING INC.		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JESSICA WHITESIDE		C/O BRRESTORATION NY INC 140 ARCADIA AVENUEOSWEGO NY 13126	09/12/2016	09/12/2021
DOL	AG		JOHN ANTHONY MASSINO		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JOHN F. CADWALLADER		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4612	JOHN F. CADWALLADER, INC.	THE GLASS COMPANY	P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	AG	*****0600	JOHNCO CONTRACTING, INC.		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORI PEDERSEN		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		JOSE CHUCHUCA		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	AG		JOSEPH FALCONE		SUITE 125 265 SUNRISE HIGHWAYROCKVILLE CENTRE NY 10457	04/07/2016	04/07/2021
DOL	NYC		JOSEPH FOLEY		66-05 WOODHAVEN BLVD. STE 2REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	DOL	*****9273	JOSEPH M LOVETRO		P O BOX 812 BUFFALO NY 14220	08/09/2016	08/09/2021
DOL	NYC		JOSEPH MARTINO		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	DOL		JOY MARTIN		2404 DELAWARE AVE NIGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL	*****5062	K R F SITE DEVELOPMENT INC		375 LAKE SHORE DRIVE PUTNAM VALLEY NY 10579	01/23/2017	01/23/2022
DOL	NYC		K.S. CONTRACTING CORP.		29 PHILLIP DRIVE PARSIPPANY NJ 07054	02/13/2017	02/13/2022
DOL	DOL		KATIE BURDICK		2238 BAKER RD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		KENNETH FIORENTINO		375 LAKE SHORE DRIVE PUTNAM VALLEY NY 10579	01/23/2017	01/23/2022
DOL	DOL	*****9732	KENT HOLLOW SIDING LLC		29A BRIDGE STREET NEW MILFORD CT 06776	01/15/2016	01/15/2021
DOL	DOL		KIM SOROCENSKI		C/O SOLUTION MATTERS INC 198 NORWOOD ROADPORT JEFFERSON NY 11776	11/19/2015	11/19/2020
DOL	DOL	*****3490	L & M CONSTRUCTION/DRYWALL INC.		1079 YONKERS AVE YONKERS NY 10704	08/07/2018	08/07/2023
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	AG	*****4643	LALO DRYWALL, INC.		221 OLD FORD ROAD NEW PLATZ NY 12561	05/20/2016	05/20/2021
DOL	DOL	*****4505	LARAPINTA ASSOCIATES INC		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		LAVERN GLAVE		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022

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DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	01/17/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	08/14/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	08/14/2017	08/14/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	01/17/2017	09/19/2022
DOL	DA	*****4460	LONG ISLAND GLASS & STOREFRONTS, LLC		4 MANHASSET TRL RIDGE NY 11961	09/06/2018	09/06/2023
DOL	AG	*****4216	LOTUS-C CORP.		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	AG		LUIS MARTINEZ	LALO DRYWALL	211 MAIN ST. NEW PALTZ NY 12561	05/20/2016	05/20/2021
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL		M ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	AG	*****6957	M B DIN CONSTRUCTION INC		8831 20TH AVENUE/SUITE 6E BROOKLYN NY 11214	11/17/2015	11/17/2020
DOL	DOL		M. ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	NYC	*****9590	MACK GLASSNAUTH IRON WORKS INC		137 LIBERTY AVENUE BROOKLYN NY 11212	12/21/2015	12/21/2020
DOL	DOL	*****1784	MADISON AVE CONSTRUCTION CORP		39 PENNY STREET WEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL		MALARKEY'S BAR & GRILL LLC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DOL	*****0705	MALARKEY'S PUB & GRUB LLC		64 VICTORIA DRIVE BINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		MARIACHI'S PIZZERIA		C/O DOUGLAS L MALARKEY 64 VICTORIA DRIVEBINGHAMTON NY 13904	02/04/2016	02/04/2021
DOL	NYC		MARTINE ALTER		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	DOL		MARVIN A STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		MASONRY CONSTRUCTION, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3333	MASONRY INDUSTRIES, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		MATINA KARAGIANNIS		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2023
DOL	DOL		MATTHEW IDEMA GENERAL CONTRACTORS INC		91 COLLEGE AVENUE POUGHKEEPSIE NY 12603	12/04/2015	12/04/2020
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL		MAURICE GAWENO		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****6416	MCCALL MASONRY		P O BOX 304 SAYRE PA 18840	08/09/2016	08/09/2021

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DOL	DOL		MCLEAN "MIKKI BEANE"		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		MCLEAN "MIKKI" DRAKE		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		MCLEAN M DRAKE-BEANE		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL	*****9445	MCLEAN M WALSH	ELITE PROFESSION AL PAINTING OF CNY	1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL	*****9445	MCLEAN M WALSH	ELITE PROFESSION AL PAINTING OF CNY	1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	NYC	*****5330	METRO DUCT SYSTEMS INC		1219 ASTORIA BOULEVARD LONG ISLAND CITY NY 11102	04/16/2014	11/19/2020
DOL	DOL		MICHAEL A PASCARELLA		SUITE 100 2105 WEST GENESEE STREET SYRACUSE NY 13219	01/06/2016	01/06/2021
DOL	NYC		MICHAEL HIRSCH		C/O MZM CORP 163 S MAIN STREET NEW CITY NY 10956	01/28/2016	01/28/2021
DOL	DOL		MICHAEL LENIHAN		1079 YONKERS AVE UNIT 4 YONKERS NY 10704	08/07/2018	08/07/2023
DOL	AG		MICHAEL RIGLIETTI		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29 MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204 NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOOR STATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	AG		MOHAMMED N CHATHA		8831 20TH AVENUE/SUITE 6E BROOKLYN NY 11214	11/17/2015	11/17/2020
DOL	NYC	*****3826	MOVING MAVEN OF NY, INC.		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	NYC	*****3550	MOVING MAVEN, INC		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	AG		MSR ELECTRICAL CONSTRUCTION CORP.		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL		MUHAMMAD BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL		MUHAMMAD BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL		MUHAMMAD PERVAIZ		C/O CHAMPION CONSTRUCTION 2131 SCHENECTADY AVENUE BROOKLYN NY 11234	11/18/2015	11/18/2020
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC	*****3613	MZM CORP		163 S MAIN STREET NEW CITY NY 10956	01/28/2016	01/28/2021
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	NYC	*****4839	NEW YORK RIGGING CORP		58-83 54TH STREET MASPETH NY 11378	02/26/2016	02/26/2021
DOL	NYC		NICHOLAS FILIPAKIS		7113 FORT HAMILTON PARKWA BROOKLYN NY 11228	12/09/2016	12/09/2021
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTI ON, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	DOL	*****6966	NORTH COUNTRY DRYWALL AND PAINT		23167 COUNTY ROUTE 59 DEXTER NY 13634	10/24/2016	10/24/2021
DOL	DOL	*****0065	NORTHEAST LANDSCAPE AND MASONRY ASSOC		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10523	01/23/2017	01/23/2022
DOL	DOL	*****1845	OC ERECTERS, LLC A/K/A OC ERECTERS OF NY INC.		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	NYC	*****0818	ONE TEN RESTORATION, INC.		2366 61ST ST BROOKLYN NY 11204	12/15/2016	12/15/2021
DOL	NYC		ORSON ARROYO		C/O METRO DUCT SYSTEMS 12-19 ASTORIA BOULEVARD LONG ISLAND CITY NY 11102	04/16/2014	11/19/2020

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DOL	NYC		PARESH SHAH		29 PHILLIP DRIVE PARSIPPANY NJ 07054	02/13/2017	02/13/2022
DOL	NYC	*****9422	PELIUM CONSTRUCTION, INC.		22-33 35TH ST. ASTORIA NY 11105	12/30/2016	12/30/2021
DOL	DOL		PETER M PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10523	01/23/2017	01/23/2022
DOL	DOL		PIERRE LAPORT		224 COUNTY HIGHWAY 138 BROADALBIN NY 12025	03/07/2017	03/07/2022
DOL	DOL	*****1543	PJ LAPORT FLOORING INC		224 COUNTY HIGHWAY 138 BROADALBIN NY 12025	03/07/2017	03/07/2022
DOL	NYC	*****5771	PMJ ELECTRICAL CORP		7113 FORT HAMILTON PARKWA BROOKLYN NY 11228	12/09/2016	12/09/2021
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC	*****4532	PROFESSIONAL PAVERS CORP.		66-05 WOODHAVEN BLVD. REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	DA	*****6817	QUADRANT METAL BUILDINGS LLC		2740 SW MARTIN DOWNS BLVD PALM CITY FL 34990	08/25/2016	08/25/2021
DOL	NYC		RAMESHWAR ASU		137 LIBERTY AVENUE BROOKLYN NY 11212	12/21/2015	12/21/2020
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP		3 PARK CIRCLE MIDDLETOWN NY 10940	01/30/2018	01/30/2023
DOL	AG	*****7015	RCM PAINTING INC.		69-06 GRAND AVENUE 2ND FLOORMASPETH NY 11378	02/07/2018	02/07/2023
DOL	DOL		REGINALD WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DA		RIANN MULLER		2740 SW MARTIN DOWNS BLVD PALM CITY FL 34990	08/25/2016	08/25/2021
DOL	DOL	*****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD MACONE		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL	*****9148	RICHARD TIMIAN	RICH T CONSTRUCTI ON	108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		3 GAYLORD ST AUBURN NY 13021	11/15/2016	11/15/2021
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	NYC		ROBERT HOHMAN		149 FIFTH AVE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL	*****3859	ROCHESTER ACOUSTICAL CORP		P O BOX 799 HILTON NY 14468	02/19/2016	02/19/2021
DOL	DOL		RODERICK PUGH		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL	*****4880	RODERICK PUGH CONSTRUCTION INC.		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		ROSEANNE CANTISANI			06/12/2018	06/12/2023
DOL	DOL		RYAN ALBIE		21 S HOWELLS POINT ROAD BELLPORT NY 11713	02/21/2017	02/21/2022

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DOL	DOL	*****3347	RYAN ALBIE CONTRACTING INC		21 S HOWELLS POINT ROAD BELLPORT NY 11713	02/21/2017	02/21/2022
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****7730	S C MARTIN GROUP INC.		2404 DELAWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	NYC		SABIR MUHAMMED		SUITE B-8 782 PELHAM PARKWAY SOUTHBRONX NY 10462	04/21/2016	04/21/2021
DOL	DOL		SALVATORE A FRESINA			08/26/2016	08/26/2021
DOL	DOL		SAM FRESINA			08/26/2016	08/26/2021
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		SANDEEP BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****9751	SCW CONSTRUCTION		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022
DOL	AG		SERGIO RAYMUNDO		109 DUBOIS RD. NEW PALTZ NY 12561	05/20/2016	05/20/2021
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL	*****1961	SHANE BURDICK	CENTRAL TRAFFIC CONTROL, LLC.	2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE BURDICK		2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE NOLAN		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****0816	SOLAR ARRAY SOLUTIONS, LLC		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL	*****4025	SOLUTION MATTERS INC		198 NORWOOD ROAD PORT JEFFERSON NY 11776	11/19/2015	11/19/2020
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		STEFANOS PAPASTEFANOU, JR. A/K/A STEVE PAPASTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL	*****9751	STEPHEN C WAGAR		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022
DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	NYC		STEVEN GOVERNALE		601 PORTION RD RONKONKOMA NY 11779	11/18/2016	11/18/2021
DOL	DOL		STEVEN MARTIN		2404 DELWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL		STEVEN P SUCATO		15-68 208TH STREET BAYSIDE NY 11360	06/23/2016	06/23/2021
DOL	DOL		STEVEN TESTA		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	NYC	*****9432	SUBLINK LTD		346 THIRD AVENUE PELHAM NY 10803	11/19/2015	11/19/2020
DOL	NYC	*****5863	SUKHMANY CONSTRUCTION, INC.		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TALAILA OCAMPA		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL	*****9852	TAP STEEL INC		ROUTE 26 3101 P O BOX 457CONSTABLEVILLE NY 13325	01/28/2016	01/28/2021

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DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****5570	TESTA CORP		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****8174	THE DALRYMPLE CORPORATION		UNIT 278 541 10TH STREET NWATLANTA GA 30318	12/01/2015	12/01/2020
DOL	DOL	*****8174	THE DALRYMPLE GROUP LLC		289 JONESBORO RD/ STE 216 MCDONOUGH GA 30253	12/01/2015	12/01/2020
DOL	DOL		TIMOTHY A PALUCK		C/O TAP STEEL INC RTE 26 3101/ P O BOX 457CONSTABLEVILLE NY 13325	01/28/2016	01/28/2021
DOL	DOL	*****3453	TORCHIA'S HOME IMPROVEMENT		10153 ROBERTS RD SAUQUOIT NY 13456	08/09/2016	08/09/2021
DOL	DOL	*****8311	TRIPLE B FABRICATING, INC.		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL	*****9407	TURBO GROUP INC		15-68 208TH STREET BAYSIDE NY 11360	06/23/2016	06/23/2021
DOL	DOL	*****6392	V.M.K CORP.		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	NYC		VALERIE VISCONTI		346 THIRD AVENUE PELHAM NY 10803	11/19/2015	11/19/2020
DOL	NYC	*****7361	VIALE HOLDINGS, INC.	MOVING MAVEN	1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL		VICTOR ROTENBERG		C/O GMDV TRANS INC 67048 182ND STREETFRESH MEADOWS NY 11365	06/24/2016	06/24/2021
DOL	NYC		VIKTAR PATONICH		2630 CROPSEY AVE BROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC		VITO GARGANO		1535 RICHMOND AVE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL		WAYNE LIVINGSTON JR	NORTH COUNTRY DRYWALL AND PAINT	23167 COUNTY ROUTE 59 DEXTER NY 13634	10/24/2016	10/24/2021
DOL	DOL	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		WHITE PLAINS CARPENTRY CORP		442 ARMONK RD	06/12/2018	06/12/2023
DOL	DOL		WILLIAM C WATKINS		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		WILLIAM DEAK		C/O MADISON AVE CONSTR CO 39 PENNY STREETWEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL	*****4043	WINDSHIELD INSTALLATION NETWORK, INC.		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4730	XGD SYSTEMS, LLC	TDI GOLF	415 GLAGE AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL	*****7345	YES SERVICE AND REPAIRS CORPORATION		145 LODGE AVE HUNTINGTON STATION NY 11476	08/09/2016	08/09/2021
DOL	NYC		ZAKIR NASEEM		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	NYC	*****8277	ZHN CONTRACTING CORP		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022

GOVERNING LAWS

This project is governed by, but not limited to, the following laws:

- General Municipal Law, Section 101, regarding separate contracts when total project exceeds \$50,000.
- General Municipal Law, Section 103-d, regarding non-collusive bidding clause.
- General Municipal Law, Section 106-b, regarding payment of contractors and subcontractors.
- General Municipal Law, Section 108, regarding Worker's Compensation Insurance.
- General Municipal Law, Section 109, regarding non-assignment of public contract.
- Labor Law, Section 220, subdivision 2, regarding 40-hour week, 8-hour day.
- Labor Law, Section 220-d, regarding wage rates and supplements.
- Labor Law, Section 220-3, regarding anti-discrimination.
- Labor Law, Section 222-a, regarding elimination of dust hazard.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1A - SCHEDULES AND REPORTS

CONTENTS:

1. Summary of the Work
2. Laws, Ordinances, Taxes, and Permits
3. Plan of Operations and Progress Schedule
4. Sequence of Work
5. Contractor's Examination
6. Notification of Owner and Architect
7. Access and Movement of Materials and Personnel
8. Job Meetings
9. Equal Opportunity
10. Wage Rates

1. SUMMARY OF THE WORK:

- A. All work as shown on the drawings and as specified herein.

2. LAWS, ORDINANCES, TAXES, AND PERMITS:

A. Taxes and Permits:

1. Exempt from New York State Sales Tax.
2. Exempt from Federal Excise Tax.
3. Not subject to building permit fees.

B. Laws and Ordinances:

The Project is subject to and Contractor shall comply with:

1. New York State Wage Rate Requirements.
2. Federal Occupational Safety and Health Administration Standards.
3. Applicable local, state, and other governing safety regulations.

3. PLAN OF OPERATIONS AND PROGRESS SCHEDULES:

- A. In order to facilitate coordination and fitting, the Contractor shall prepare a "Plan of Operations and Progress Schedule" which shall show concisely the manner in which work will be started, prosecuted, and completed.
- B. After approval of the above document, the Contractor shall be responsible for seeing that it is adhered to and for ascertaining that proper coordination is maintained between work of all Contracts.

4. SEQUENCE OF WORK:

- A. It is intended that the work under this Contract be executed without interruption of and with minimum interference with school operations.
- B. Notify utility companies as required by local ordinance and State Law.
- C. Ascertain location of utilities inside and outside of building before commencing demolition work of any kind.
- D. Take precautions to protect the adjacent spaces and surfaces from flying or falling debris. Prevent dust and dirt from rising and clean any dust created by this work.
- E. Contractor shall not employ any labor, materials, or means whose employment or utilization during the course of the work tend to or in any way cause or result in strikes, work stoppages, delays, suspension of work, or similar troubles by workmen under his employ, his Subcontractors, or any of the trades working in or about the premises where work of this Contract is being performed.
- F. The work shall be done with due care; the Contractor will be held responsible for any damage which may be caused thereby to any part or parts of existing structures, site, or items designated to remain. Before proceeding with demolition work, ascertain need for and accomplish any required protection measures. Embedded anchorage and attachments shall be removed to permit proper patching. Contractor will be liable for damage caused to any parts of existing structure or work designated to remain.
- G. Where removal work occurs or where new and old work join, the immediate adjacent surfaces or so much thereof as is required by the involved conditions shall be cut, removed, patched, repaired, or refinished, and left in as good a condition as existed prior to the commencing of the work. The materials and workmanship employed shall conform to that of the original work.
- H. The Contractor shall establish and maintain a rate of work progress so as to insure completion of the construction operations within the time stipulated in the Agreement.
- I. Where materials or construction are to be applied or attached to existing surfaces or construction and to have included in his bid all costs for preparatory work on such surfaces or construction as necessary to permit the proper execution of the required work.
- J. Upon completion of all work under this Section, the Contractor shall remove all tools, materials, plant, apparatus, and rubbish of any sort. The premises shall be left clean, neat, and orderly to the entire satisfaction of the Architect.

5. CONTRACTOR'S EXAMINATION:

- A. Contractor shall take all field measurements as required and shall satisfy himself as to the nature of equipment and facilities required for and the conditions under which he will be obliged to carry out the execution of the work in every particular which might in any way affect the cost thereof. The submission of a Proposal will be construed as conclusive evidence that such an examination has been made, and no subsequent claims for additional costs of labor, materials, appliances, equipment, etc., or for difficulties encountered which could have been foreseen has such an examination been made, will be recognized.

6. NOTIFICATION OF OWNER AND ARCHITECT:

- A. Before starting any work relating to existing utilities or school services, the Contractor will be required to give 24 hours notice to the Architect and Owner and obtain their approval in writing before proceeding with such work.
- B. All work involving active utility or school service shall be performed with the utmost dispatch and without discontinuance or disruption of such services except as and when approved by the Owner.

7. ACCESS AND MOVEMENT OF MATERIALS AND PERSONNEL:

- A. The direction of the Owner as to access to the existing building and the limits within which each Contractor shall control the movements of his personnel and materials shall be strictly followed. Generally, the movement of Contractor's personnel within the premises shall be restricted to the minimum necessary for the performance of required work. Under no circumstances shall Contractor's personnel at any time enter upon any portions of the building or premises where such entry is not strictly necessitated by the work required under this Contract. The Contractor shall rigidly enforce these restrictions; violation thereof shall be cause for dismissal of the offender.
- B. Delivery of equipment and materials shall be confined to the limits designated, and storage shall be where directed by the Owner. Temporary enclosures necessary for such storage shall be provided by the Contractor and shall be removed when no longer required.
- C. All work in the existing building shall be performed with the least possible annoyance to the occupants of the building.

8. JOB MEETINGS:

- A. Pre-Construction Conference: Upon receiving notice that he has been awarded the Construction Contract for the project, and within ten (10) days of such notice, the Contractor shall make an appointment to meet with the Architect and his representative(s), and shall also instruct his Subcontractors or their representatives to be made personally known to each other and to plan and initiate the most favorable course of the upcoming construction work.

- B. Regular Job Meeting: The Contractor, Architect, and those Subcontractors whose presence is necessary, shall attend periodic meetings for the purpose of discussing the progress and execution of the work. These meetings shall be held at a time and place designated by the Owner's Representative. The proceedings of these meetings will be recorded by the Owner's Representative and a copy will be subsequently furnished the Contractor for his use. It will be the Contractor's responsibility to distribute copies, as may be required, to his Subcontractors.

9. EQUAL OPPORTUNITY (LABOR LAW SECTION 220-3):

- A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post, in conspicuous places available to employees and applicants for employment, notices to be provided setting forth the provisions of the non-discrimination clause.
- B. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- C. The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding a notice to be provided advising the said labor union or worker's representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. The Contractor shall comply with Executive Order 11246, Federal Equal Employment Opportunity, unless exempt, in accordance with Section 203 of this order.

10. WAGE RATES:

- A. The Labor Law of New York State provides, among other things, that it shall be the duty of the fiscal officer to make a determination of the schedule of wages to be paid to all laborers, workmen, and mechanics employed on public work projects including supplements for welfare, pension, retirement, vacation, and other benefits, in accordance with prevailing practice in the locality. The Contractor shall comply with all requirements of this law as it applies to this project and locality.
- B. The rates of wages determined by the New York State Industrial Commissioner pursuant to the Labor Law are set forth as per the schedule contained within this Project Manual.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1B - TEMPORARY SERVICES AND MISCELLANEOUS REQUIREMENTS

CONTENTS:

1. Scope
2. Temporary Utilities
3. Temporary Barricades
4. Fire Protection
5. Parking and Traffic Control
6. Restoration of Premises
7. Cutting and Patching
8. Rough Openings and Routine Items
9. Water Tightness
10. Miscellaneous Requirements

1. SCOPE:

- A. Provide, maintain, and remove when no longer required temporary services and utilities as specified, except as may be otherwise provided by the Owner; include costs of obtaining permits, labor, equipment, fixtures, lamps, and similar items as well as duties, levies, or taxes imposed.

2. TEMPORARY UTILITIES:

- A. Water and electricity for construction purposes in quantities judged reasonable by the Architect will be furnished to the Contractor by the Owner without charge. The Contractor shall ascertain where these services will be available, make temporary connections as required, and remove same upon completion.
- B. Temporary toilets: The Owner will allow the use of certain toilets within the building during the course of the work, maintain in sanitary condition, and, upon completion of the work, surrender them to the Owner in as good condition as found.

3. TEMPORARY BARRICADES:

- A. Temporary closures and barricades, as may be required to maintain and protect the new and existing work and to protect the public from danger, shall be provided.
- B. Protect temporary closures and barricades to guard new and existing work from vandalism during and after working hours.

4. FIRE PROTECTION AND PREVENTION:

- A. Each Prime Contractor shall take all precautions required to prevent fires as a result of his operations. Flame cutting torches, blow torches, or welding tools shall be used in strict accordance with applicable safety rules and regulations.

- B. When welding tools or torches of any type are in use, the Prime Contractor using such equipment shall have available a fire extinguisher of the Multi-Purpose Type ABC in the immediate vicinity of the work. The fire extinguishers shall be provided and maintained by said Contractor in usable condition at all times.
- C. In addition to the requirements of Paragraphs A and B above, the General Work Contractor shall provide fire extinguishers in working order located at intervals throughout the construction operations. These extinguishers shall not be removed from their mounting except to be tested or for the purpose of fighting a fire. They shall be relocated as necessary by the General Work Contractor when progress of the work demands. These fire extinguishers will remain the property of the General Work Contractor.
- D. Keep fire hydrants on or adjacent to the work accessible to fire fighting equipment at all times.

5. PARKING AND TRAFFIC CONTROL:

- A. Parking on site will be at the Owner's discretion and approval only.
- B. Protect existing roads and repair damage caused to road or site.

6. RESTORATION OF PREMISES:

- A. Walls and floor areas and any other surfaces that are broken, damaged, pitted, or otherwise defective as a result of receiving, handling, or storage of materials or the performance of any work under any Contract, or by reason of neglect of any Contractor, shall be fully restored to the satisfaction of the Owner, and the full cost, therefore, shall be borne by the Contractor.
- B. Sites shall be cleaned daily and restored to original condition at completion of construction operations.
- C. Roll-offs shall be located so as not to interfere with school operations, and paving or landscaping shall be restored when removals are completed.

7. CUTTING AND PATCHING:

- A. Cutting and patching covers adjustment to, necessary reworking, or removal of elements of construction in both new and existing work to comply with work of the Contract documents. The following definitions for cutting and patching apply:
 - 1. Cutting: Physical modification or removal of construction work (walls, floors, ceilings, roofs, etc.) or installed materials (doors, windows, panels, etc.), both new, factory-finished, and existing.
 - 2. Patching: Restoration or replacement of construction work (walls, floors, ceilings, roofs, etc.), both new, factory-finished, and existing. Patching shall include installation of new finish, materials, and reconstruction of walls, floors, etc. All patching shall match adjacent materials and finishes unless otherwise indicated.

- B. Each Prime Contractor, unless otherwise indicated, shall hire a qualified General Contractor to provide all equipment, labor, material, and incidentals necessary for cutting and patching as required for the installation of his work in new or existing walls, floors, and ceilings.
- C. Each Prime Contractor will be held responsible for his own and his Subcontractors' work in cutting and patching and the correction of the work of other Prime Contractors if damaged by him.
- D. Each Prime Contractor shall bear the expense of all cutting, patching, repairing, or replacing of the work of other trades made necessary by any fault, error, or tardiness on the part of or damage done by him. He shall employ and pay the Contractor whose work is involved.
- E. In existing structures, each Prime Contractor shall, unless otherwise indicated, hire a General Contractor to do all cutting, patching, repairing, or replacing of General Work required for the removal of existing work or installation of his new work. Secure approval before cutting.
- F. In no case may floors, walls, or ceilings that are waterproofed be cut for the admission of any equipment or materials nor may any structural member be pierced without written permission.
- G. Where roofing or waterproofing membranes must be cut to accommodate the work of any Prime Contractor, such Prime Contractor shall employ a qualified roofing Contractor to do all required cutting, patching, and repairs of the roofing or waterproofing, and then only after approval of the methods proposed by the Architect and/or any agency that may have a roof bond or guarantee/warranty in force.
 - 1. Approval of all materials, methods, and roofing Contractor used in cutting, patching, and repairing existing roofing membrane shall be obtained from agency, or agencies, holding a roof bond or guarantee/warranty in force.

8. ROUGH OPENINGS AND ROUTINE ITEMS:

- A. Each Prime Contractor will provide all openings, chases, recesses, lintels, and bucks in new or existing construction that are required for the admission of his work.
- B. Each Prime Contractor shall furnish all necessary information (i.e. location and size of openings, chases, etc., and other built-in field conditions) to the other Prime Contractors in ample time for the installation of his work.
 - 1. Ample time shall mean:
 - a. In concrete work, before reinforcing is placed.
 - b. In masonry, before wall construction reaches location of opening, chase, or other item.
 - c. In drywall, before second or finish face is applied.
 - 2. This paragraph shall not be construed to include any items in earth such as trenches, etc.

9. WATER TIGHTNESS:

- A. Each Prime Contractor shall be held responsible for the water tightness of his respective products, materials, and workmanship as installed in the job. This includes all work either specified to be watertight or inferred by general practice to be watertight. All walls, roofs, glazing, windows, doors, sleeves, through foundation or walls, flashings, and other items shall be in a watertight condition before final payment is requested.
- B. If a Prime Contractor feels that the details or materials, as drawn or specified, are not satisfactory to produce a watertight job, he shall so inform the Architect before installation. The Prime Contractor shall submit his proposed substitution or alternative method of doing the work for the Architect's approval. Any approved change shall be executed by the Prime Contractor and made watertight at no additional cost to the Owner.
- C. Any proposed changes encountered during the bidding procedure may be submitted in the proper form and time to the Architect for consideration as a change to be covered by ADDENDA.

10. MISCELLANEOUS REQUIREMENTS:

- A. Contractor shall verify all existing conditions prior to proceeding with new work installations.
- B. Contractor shall be responsible for all verification of dimensions shown.
- C. Contractor shall retain all existing fire exit locations with the school complex during construction as necessary to provide safe egress to all inhabitants as per State and Local Codes.
- D. Contractor shall seal all areas of construction to prevent dust and debris from entering areas other than location of installation.
- E. Contractor shall meet all OSHA requirements for sanding and sealing as required.
- F. Contractor shall protect all existing walls, equipment, and apparatus from damage during the construction process.
- G. Contractor shall construct Architect/O.S.H.A. approved, code compliant barricades and construction area separation between all proposed work and student occupied spaces. There shall be no interference with required educational capabilities during the construction of this project while classes are in session.
- H. Contractor shall relocate any existing H.V.A.C. intake/discharge units as to prevent the distribution of any demolition/construction related fumes and dust during the course of the entire project. Relocate same to original functioning position upon project completion.

- I. All construction materials, equipment, personnel, debris, dust, fumes, noise, smells, etc. shall be isolated from building occupants and other vehicular traffic by way of "special necessary construction" during the entire construction process. provide all required temporary stairs, ramps, fire alarm systems, fire extinguishers, illuminated exit signs, door hardware, and floor finishes needed to maintain all occupied spaces safe and code compliant at all times.
- J. Contractor must provide schedules of work which include a minimum of 48 hours or manufacturer's recommended time for "baking out" and exhausting of volatile organic compounds used during construction prior to building occupancy. Provide and maintain at the site "MSDS" forms indicating safe times before occupancy of spaces.
- K. The District must provide a continuously updated written emergency exit plan which provides for the relocation of all students and staff immediately upon a break in the above required "separation of construction areas" as to minimize exposure to all students and staff. Coordinate with all contractors, building staff, and students for their use.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1C - INSURANCE REQUIREMENTS

CONTENTS:

1. General Requirements
2. Certificates of Insurance
3. Types of Coverage and Minimum Limits
4. Continuity

1. GENERAL REQUIREMENTS:

- A. In addition to the requirements specified under Article 11 of the General Conditions and the insurance required by law, the Contractor shall, before commencing work under this Contract and during the period of construction to the date of final acceptance by the Owner, purchase, effect, and maintain insurance coverage as described in this section.
- B. No Subcontractor shall be permitted to undertake any portion of this Contract without first having presented to the Contractor certification attesting to similar coverages as are required of the Contractor under this section. Such certification shall be issued to and in a form acceptable to the Contractor.
- C. The Contractor agrees to effectuate the naming of the Owner and the Architect as additional insureds on the Contractor's insurance policies, with the exception of Workers' Compensation and NY State Disability.
- D. Each policy naming the Owner and Architect (and Construction Manager when applicable) as additional insureds must:
 1. Be an insurance policy from an A.M. Best A-rated or better insurer, licensed to conduct business in New York State; and
 2. State that the Contractor's coverage is primary and non-contributory coverage for the Owner, its Board of Education, employees and volunteers.
- E. The Contractor agrees to indemnify the Owner for any applicable deductibles and self-insured retentions.

2. CERTIFICATES OF INSURANCE:

- A. Certificates of Insurance shall be transmitted in duplicate to the Architect for forwarding to the Owner, and any Certificate found to be incomplete or not according to the proper form will be returned as being unsatisfactory. A letter of transmittal from each insurance company involved must be submitted certifying that the certificate is issued pursuant to their authorization.
- B. The Owner, Architect (and Construction Manager when applicable) must be listed as an additional insured by using standard or other endorsements

that extend coverage to the Owner, Architect (and Constuction Manager when applicable) for both on-going operations (CG 20 38) and products and completed operations (CG 20 37), latest version. The decision to accept an endorsement rests solely with the Owner. A completed copy of the endorsement(s) must be attached to the certificate of insurance. The certificate of insurance must describe the specific services provided by the Contractor (e.g., roofing, carpentry, or plumbing) that are covered by the liability policies. At the Owner's request, the Contractor will provide copies of the declarations pages of its liability and umbrella/excess policies with a list of endorsements and forms. If so requested, the Contractor will provide a copy of the policy endorsements and forms. A fully completed New York Construction Certificate of Liability Insurance addendum (ACORD 855 2014/05) must be included with the certificates of insurance. For any "Yes" answers on Items G through L on this addendum, additional details must be provided to the Owner in writing. Contracts with subcontractors shall require them to provide the same additional insured coverages and documents.

C. Certificates shall contain:

1. Name and address of the insured.
2. Job location and title of the Contract.
3. Policy number and expiration date.
4. Issuance date of Certificate.
5. Types of coverage included.
6. Limit of Liability for each type used.
7. Types of operations covered (Classifications).
8. Types of operations or of coverages specifically excluded.
9. Thirty (30) day cancellation or non-renewal notice.
10. Owner, Architect or Owner representatives as additional insured.
11. Hold Harmless Clause indemnifying Owner, Architect or Owner representatives
12. Name of Insurance Company.
13. Counter Signature of Resident Agent in State of project location.

D. No Certificate covering policies containing escape clauses or exclusions contrary to the Owner's interests will be accepted.

E. The delivery of Certificates of Insurance authorizes the Owner or Architect to make direct inquiry of and to receive direct response from the insurance carrier regarding questions arising during the performance of the Work which are pertinent to the coverages under the policies.

3. TYPES AND MINIMUM LIMITS OF COVERAGE:

A. The Contractor will obtain and keep in full force and effect during the term of the Contract, at the Contractor's sole cost and expense, the following insurance:

B. Commercial General Liability Insurance

- o \$1,000,000 per occurrence/ \$2,000,000 aggregate
- o \$2,000,000 Products and Completed Operations
- o \$1,000,000 Personal and Advertising Injury
- o \$100,000 Fire Damage
- o \$10,000 Medical Expense
- o The general aggregate must apply on a per-project basis.

C. Automobile Liability

- o \$1,000,000 combined single limit for owned, hired and borrowed and non-owned motor vehicles.

D. Workers' Compensation and NYS Disability Insurance

- o Statutory Workers' Compensation (C-105.2 or U-26.3); and New York State 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 an exemption must file a CE-200 form with New York State. The form can be completed and submitted directly to the Workers' Compensation Board online.

E. Builders Risk

- o Must be purchased by the Contractor to include the interests of the Owner and Contractor jointly in a form satisfactory to the Owner. The limits 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.

F. Umbrella/Excess Liability Insurance

- o Umbrella/Excess coverage must be on a follow-form basis.
- o With the exception of contracts that require work above a height of one story (ten feet), all contracts for less than or equal to \$1,000,000 will require an Umbrella/Excess Policy with limits of \$5,000,000 per occurrence/\$5,000,000 aggregate.
- o All contracts for more than \$1,000,000 or that require work above a height of one story (ten feet) will require an Umbrella/Excess Policy with limits of \$10,000,000 per occurrence/\$10,000,000 aggregate.

G. Asbestos, Lead and/or Hazardous Material Work

- o Asbestos/Lead Abatement Insurance: \$2,000,000 per occurrence/\$2,000,000 aggregate including products and completed operations.
- o 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 must pre-date the inception of the Contract. If the Contractor is using motor vehicles for transporting hazardous materials, the Contractor must maintain pollution liability broadened coverage (ISO Endorsement CA 9948) as well as proof of MCS 90.
- o Coverage must extend for a period of three years following final completion of the Work.

- o 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.
- H. The Contractor will obtain and keep in full force and effect during the term of this Contract, at the Contractor's sole cost and expense, Owners Contractors Protective (OCP) Insurance. The Owner will be the named insured on all OCP policies and there will be no additional insureds. The OCP Insurance must be from a carrier licensed to conduct business in New York State.
 - 1. With the exception of Contracts that require work above a height of one story (ten feet), all Contracts for less than or equal to \$1,000,000 will require an OCP Insurance Policy with limits of \$1,000,000 per occurrence/\$2,000,000 aggregate.
 - 2. All Contracts for more than \$1,000,000 or that require work above a height of one story (ten feet) will require an OCP Insurance Policy with limits of \$2,000,000 per occurrence/\$4,000,000 aggregate.
- I. Contractor's Contingent Liability: The Contractor shall procure, pay for, and maintain such insurance as will protect the Contractor from his contingent liability for damages and for injury to the person or property of another which may arise from the operations of all Subcontracts under this Contract.
- J. Contractor's and Employees' Equipment: The Contractor assumes responsibility for all injury to or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of Contractor's employees from whatever cause arises.

4. CONTINUITY:

- A. Contractor acknowledges that failure to obtain the foregoing insurance on behalf of the Owner constitutes a material breach of contract and subjects the Contractor to liability for damages, indemnification and all other legal remedies available to the Owner. The Contractor must provide the Owner with proof satisfactory to the Owner in the Owner's sole and absolute discretion that the above requirements have been met prior to the commencement of Work.
- B. The Contractor acknowledges that its failure to obtain or keep current the insurance coverage required by this Addendum shall constitute a material breach of Contract and subjects the Contractor to liability for damages, including but not limited to direct, indirect, consequential, special and such other damages the Owner sustains as a result of such breach. In addition, the Contractor shall be responsible for the indemnification to the Owner and the Architect, of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorney's fees.

- C. The Contractor shall require all Subcontractors to carry the same insurance coverages and limits of liability, as are required to be carried by the Contractor and adjusted to the nature of Subcontractors' operations and submit proof of same to the Owner for approval prior to start of any Work. The Contractor shall also require that Subcontractors require Sub-Subcontractors to carry the same insurance coverages and limits of liability, as are required to be carried by the Contractor and adjusted to the nature of Sub-Subcontractors' operations and submit proof of same to the Owner for approval prior to the start of any Work. This includes, but is not limited to requiring that Subcontractors and Sub-Subcontractors name the Owner as an additional insured by using endorsements CG 2038 and CG 2037 or their equivalents and providing Acord 855 NY Form. In the event the Contractor fails to obtain the required certificates of insurance and other required proof of insurance from the Subcontractor or its subs and a claim is made or suffered, the Contractor shall, to the fullest extent of the law, indemnify, defend, and hold harmless the Owner, the Owner's Board of Education, the Architect, Engineers, Consultants, and Sub-consultants and their agents, employees, officers, or representatives 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.
- D. The Contractor assumes responsibility for all injury or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of the Contractor's employees from whatever cause arises. Any policy of insurance secured covering the Contractor or Subcontractors leased or hired by them and any policy of insurance covering the Contractor or Subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.
- E. The Owner in good faith may adjust and settle a loss with the Contractor's insurance carrier.
- F. The Owner and the Contractor waive all rights against each other and any of their Subcontractors, Sub-subcontractors, agents and employees for damages caused by fire or other perils to the extent of actual recovery of any insurance proceeds under any property insurance policy procured, pursuant to this Addendum, or other property insurance applicable to the Contractor's Work.
- G. Before commencement of its Work, the Contractor shall obtain and pay for such insurance as may be required to comply with its obligations pursuant to the Contract, including, but not limited to any indemnification and hold harmless provisions.
- H. Review and acknowledgment of the Certificate of Insurance or other proof of insurance by the Owner or the Architect shall not relieve or decrease the liability of the Contractor hereunder.

- I. If the terms of policies expire before the Contract is completed or during the period of completed operations coverage, and the Contractor fails to maintain continuance of such insurance, the Owner is entitled to provide protection for itself, to pay premiums therefor, and to charge the cost thereof to the Contractor.
- J. In the event of loss by fire or other insured hazard during the term of the Contract, the Contractor shall cooperate with the Owner and Architect and the insurance adjusters in all procedures incidental to the expeditious adjustment of the loss and shall during this period maintain progress of construction. The Contractor will not be relieved from his obligations for the proper execution of his Contract except that the time of completion may be extended for such number of days as may have been delayed by reason of such loss, as determined by the Architect.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1D - PRODUCT APPROVAL STANDARD

CONTENTS:

1. Definitions
2. Proof of Compliance
3. Inclusion of Specification of Non-Specified Products
4. Consideration of Equivalents After Award of Contract

1. DEFINITIONS:

- A. The term "product" shall include material, equipment, assembly methods, manufacturer, brand, tradename, or other description.
- B. Reference to be approved equal or similar terms mean that approval of the Architect is required.

2. PROOF OF COMPLIANCE:

- A. Whenever the Contract Documents require that a product be in accordance with Federal Specifications, ASTM Designation, ANSI Specification, or other Association Standard, the Contractor shall present an affidavit from the manufacturer of a proposed product certifying that it complies therewith.
- B. Where requested or specified, submit supporting test data to substantiate compliance.

3. INCLUSION IN SPECIFICATION OF NON-SPECIFIED PRODUCTS:

- A. If a Contractor has based his bid upon products, materials, or items not specifically described or named in the specifications, he may be required, prior to Award of Contract, to submit the names, types, brand, or manufacturer of products included in his bid for the specified items.
- B. Supporting data documenting wherein the proposed materials, products, or equipment may vary from those specified may be required and will be the responsibility of the Contractor.
- C. The risk of whether bid equivalents will be accepted will be borne by the Contractor.

4. CONSIDERATION OF EQUIVALENTS AFTER AWARD OF CONTRACT:

- A. Equivalent products will be considered after Award of Contract if:
 1. Previously accepted or specified product is not available because of strike, lock out, bankruptcy, or discontinuance of its manufacture.
 2. Specified performance or guarantee cannot be attained in the Contractor's judgement.

- B. Additional products, when submitted for consideration, must be accompanied by documentation attesting to the foregoing and establish equivalency in the judgement of the Architect, the burden of proof for which shall be the Contractors.
- C. Request for product changes, other than equivalents, if accepted, shall be effected by Change Order.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1E - ALTERNATES

1. GENERAL REQUIREMENTS:

- A. Each Contractor shall state in his Proposal the amount to be added or deducted from his Base Bid for the difference in cost between the work described under each Alternate and the corresponding work specified under his Base Bid.
- B. Alternate bids shall reflect the increase or decrease in cost of all work of every nature which may be affected thereby, and no subsequent claims for extras by reason of the Contractor's failure to observe this requirement will be considered.
- C. Except as otherwise described or approved, material and workmanship required by the Alternates differ from the requirements shown on the drawings or specified for corresponding items, the Alternate's construction and materials will be subject to the approval of the Architect.
- D. Submit shop drawings and samples of the work under each accepted Alternate as per "General Conditions" requirements.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01015 - PROJECT SCHEDULE

1.01 SUMMARY

A. Section includes:

1. Work sequence.
2. Contractor use of premises.
3. Owner occupancy.

1.02 WORK SEQUENCE

A. Project Start:

1. Commence construction activity at the site as soon after contract award, unless specified otherwise, as required to comply with specified Construction Schedule.
2. Schedule material deliveries to correspond with starting dates so that materials are on site on required start date.

B. Coordination:

1. Schedule all construction activities at the site with Architect, Construction Manager (if applicable) Owner, and other prime contractors to avoid, to maximum extent, interference with Owner's operations and to meet specified completion dates.
 - a. It is the responsibility of all Prime Contractors to meet the Completion Schedule within the Owner's Educational Schedule.
 - b. Coordinate construction activities with school calendar issued by Owner to each Prime Contractor to avoid interference with normal educational process by Owner.
 - c. Review requirements of Contract Documents for each Prime Contract in relationship to requirements for other Prime Contractors and the Owner's Educational Schedule.
2. Coordinate all interruptions of building services or shut-down of building systems with Architect, Construction Manager (if applicable) and Owner, and obtain written approval of proposed schedule for interruptions or shut-down from Architect, Owner, and/or Construction Manager (if applicable).
 - a. If, in the opinion of the Owner or Construction Manager (if applicable), any such interruption or shut-down will affect life or safety of building occupants, schedule interruption of shut-down at a time acceptable to the Owner, when classes are not in session, or after normal working hours.

- b. Extra payment for overtime outside normal working hours required by any such interruption or shut-down will not be made by Owner. Prime Contractor requiring overtime shall do so at his own cost and shall be responsible for extra costs incurred by other Prime Contractors as a result.
- c. Insure all equipment, fittings, pipe, and similar items required are on hand before interrupting or shutting down existing systems.
- d. Notify all inspectors and representatives of utility companies, village officials, Architect, Construction Manager (if applicable), Owner, and similar parties by letter in advance of required changeovers, tie-ins, removals, and similar operations.

1.03 CONTRACTOR USE OF PREMISES

A. Access to Building:

- 1. All Prime Contractors are directed to schedule all construction activities with Owner to allow Owner's full use of building areas and systems for normal educational process. Owner acknowledges Prime Contractors will require access to Owner-occupied areas, rooms, and systems, and intends to cooperate in making rooms and systems available for construction activities.
- 2. Notify Project Representative in advance of any requirements for access to any existing building outside normal working hours and days.

B. Building Security:

- 1. Owner will maintain building security at all times for his sole benefit. Each Prime Contractor shall retain full responsibility for security and protection of work of his Prime Contract until final acceptance by the Owner.

C. Maintenance of Building Circulation and Exits:

- 1. Maintain circulation corridors, exits, and exit stairs unobstructed from equipment and materials, except in areas of construction activity closed by temporary partitions.

1.04 OWNER OCCUPANCY

- A. Normal School Year: Owner intends to maintain full education program during the normal school year throughout duration of project, and will make full use of buildings and sites, unless otherwise specified.
 - 1. School and special activities may be conducted within buildings and on sites after regular school hours and on weekends during the normal school year.

2. Free access by Owner's personnel to building and site areas not scheduled for alteration or dimensional change shall be maintained by all Prime Contractors.

3. Owner's personnel will perform normal custodial and maintenance services for building areas and systems not involved in construction activities, unless otherwise indicated.

B. Summer School:

1. Owner will staff the buildings with at least administrative, custodial, and maintenance personnel during the scheduled Summer Recess.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01020 - ALLOWANCES

1.01 WORK INCLUDED

- A. The Contractor shall provide all labor, materials, equipment and services so as to perform all work of this section and related work indicated on the Construction Drawings and as specified herein, including, but not limited to, the following:
1. Inclusion of the Allowances herein.
 2. In addition to the work indicated on the Construction Drawings and elsewhere in this Project Manual and specification, the Contractor shall perform additional work as may be ordered by the Owner's Representative, Owner, or Architect.
 3. The following amounts are for any additional work as may be required or ordered by the Owner, Owner's Representative, or Architect or required due to field related conditions. Any additional work relative to these allowances will be authorized and instituted through the Change Order process. Any unused portion in whole or in part of the allowance shall be refunded to the Owner, also through the Change Order process.
 4. The Contractor's costs for unloading and handling at the site, overhead, profit and other expenses contemplated for the stated allowance amounts shall be included in its contract sum and not in the allowances.

1.02 RELATED WORK

- A. Refer to the related and associated divisions of the Project Manual and Specification for related additional or supplementary details and information.

1.03 CONTRACT DOCUMENTS

- A. Applicable provision of the Conditions of the Contract shall govern all work under this section.

1.04 ALLOWANCES

1. The Site Contractor shall include in Base Bid SC-1 the sum of Twenty-Thousand Dollars (\$20,000).
2. The General Contractor shall include in Base Bid GC-1 the sum of Twenty Thousand Dollars (\$20,000).
3. The HVAC Contractor shall include in Base Bid MC-1 the sum of Ten Thousand Dollars (\$10,000).
4. The Plumbing Contractor shall include in Base Bid PC-1 the sum of Ten Thousand Dollars (\$10,000).
5. The Electrical Contractor shall include in Base Bid EC-1 the sum of Fifteen Thousand Dollars (\$15,000).

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01030 - SPECIAL PROCEDURES AND PROVISIONS

PART 1 - GENERAL

1.01 CONTRACTOR'S SUPERINTENDENT

- A. The Contractor must devote his time and personal attention to the work and shall employ and retain at the building from the commencement until the entire completion of the work a Contractor's Superintendent competent and capable of maintaining proper supervision and care of the work and acceptable to the Architect, who, in the absence of the Contractor and irrespective of any superintendent or foreman employed by any Subcontractor, shall see that the instructions of the Owner are carried out.
- B. The Contractor shall employ a competent senior superintendent. Such superintendent may not be replaced during the duration of the Project, including the completion of Punch List, unless approved by the Architect.
- C. The Contractor is to provide a resume of the Contractor's Superintendent to the Owner's Representative.
- D. The Contractor shall, at all times during the work, have a representative on site who communicates in English.

1.02 REPAIRING

- A. The Contractor shall do all repairing of work that becomes damaged by his workmen or the workmen of any of his subcontractors during the progress of his work or prior to its acceptance.
- B. All existing work that is damaged or disturbed during the alteration and finish work to the building shall be left in the condition as originally found.
- C. Any exterior areas damaged or disturbed by work of this Contract shall be properly repaired and left in sound condition and the premises shall be left clean and orderly.

1.03 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor will be held responsible for all work and materials provided for by the plans and specifications until the work is completed and accepted. The Contractor will be held responsible also for any and all damages which may arise or occur to any party whomsoever by reason of work of this project, delivery and storing of materials, the opening or blocking of streets and walks or by neglecting to provide proper lights, guards, barriers, any other safeguards to prevent damage to property or injury to persons.

- B. Where openings cause exposure to outside elements, the Contractor shall provide necessary protection and coverings to prevent damage from frost or water.
- C. Provide and maintain temporary dustproof partitions to enclose spaces used by the Owner and relocate as required. Remove when no longer needed.
- D. The Contractor assumes responsibility for all injury to or destruction of or loss by theft or pilferage of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form of work and personal property of his employees regardless of the cause.
- E. Each Contractor shall be responsible for their own material and equipment until completely installed, inspected for completeness and correctness, and signed off by the Architect or his duly appointed representative.
- F. The Contractor shall provide written guarantee of the complete installation to be free from defects in materials and workmanship in accordance with Section 01700. Any portion of the work judged inferior shall be replaced by the Contractor at no additional cost to the Owner.
- G. The cost/value of required repair/replacement of any non-conforming items as documented by the Architect's subject to inclusion in the Architects "Record of Unacceptable or Non-Conforming Work" and will be the subject of a fixed dollar amount of credit due to the Owner, prior to project closeout in enforcement of AIA Document A201, Item 12.3, "Acceptance of Non-Conforming Work". If the contractor delays resolution of non-conforming work, the fixed dollar amount of credit is subject to a proportional cost increase at the discretion of the Architect.
- H. The Contractor shall maintain operational exits, exit lights, danger signs, open trench markings, fire emergency equipment, night lights, and proper storage facilities for equipment and materials as directed through the length of the contract.
- I. The Contractor shall take over and maintain the site immediately after receiving the order to start work. Provide protection of property and utilities until work of the Contract is complete and accepted. The Contractor shall be responsible for the safety of any adjoining property, including paving, utility mains, pipes, conduit, etc., and shall, at his own expense, protect and maintain same in at least as good a condition as that in which they were found.
- J. All seeded areas, pavements, walks, curbs, and approaches shall be kept clear at all times and, if disturbed by this construction work, shall be repaired and restored with materials to match existing.
- K. Before commencing any work, the Contractor shall verify all dimensions, coverage, and conditions prevalent at the job sites. If

no corrections are brought to the attention of the School District and the Engineer before starting installation, the Contractor will be totally responsible for the installation providing complete coverage of the area designated.

- L. For Additions to Existing Buildings: The General Contractor is responsible for correct finish floor alignment between existing building and proposed addition. At each finish floor, General Contractor shall utilize a licensed New York State surveyor to check all finish floor elevations shown for accuracy and shall be responsible for establishing said elevations prior to shop drawing submittal. The General Contractor's submission of steel and or concrete shop drawings shall contain said information and be the final basis for all other established elevations. The architect will accept said elevations as final, as the submission will include a licensed surveyor's certification of same.
- M. Upon completion of the work, the Contractor shall furnish as-built drawings showing the exact locations of every new item.
- N. It is assumed that Contractor's prices are based on scope of work complete and as confirmed by site(s) inspections prior to bidding.
- O. The Contractor shall be responsible for all incidental electric and plumbing work required to complete work under this Contract.
- P. The Contractor shall be required to conform to all OSHA requirements regarding Lock-out/Tag-out procedures. This shall include, but not be limited to, disconnecting the power to any equipment to be serviced via a disconnect switch or breaker, locking out this power source, and tagging this lockout with appropriate wording as per OSHA requirements. This shall apply to any power source associated with this project.
- Q. Safety and Security during Construction Statements: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Items 3a through 3e.
- R. Additional Requirements of the Contractor:
 - 1. No drinking of alcoholic beverages or use of controlled substances allowed on the grounds. No reporting to work impaired by alcohol or controlled substances is allowed. The Contractor bears the responsibility of determining if its, or its subcontractors, employees are in any way impaired which would jeopardize the safety of the public, the employees of other Contractors and their Subcontractors, the Owner, Architect, and Construction Manager.

2. All Contractors are to refrain from conversing with school personnel and students. Any construction employees found doing so will be removed from the site.
 3. All Contractors are to refrain from using indecent language. All doing so will be removed from the site. Art work or decoration found on vehicles belonging to the Contractor's or Subcontractor's employees parked on or near the school property which contain indecent language or pictures shall either be covered or removed from the location.
- S. Separation of Construction Statement: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item D.
1. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs, or elevators designated for students or school staff.
 2. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
 3. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety, and educational capabilities at all times that classes are in session.
- T. Fire Prevention: There is no smoking allowed anywhere on school property per New York State law. Violators are subject to a \$1,000 fine and/or banishment from the property.
1. Any holes in floors or walls should be sealed with a fire-resistant material.
- U. Construction Noise: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item H.
- V. Construction Fume Control: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item I.
- W. Off-Gassing Control: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item J.

- X. Asbestos Code Rule 56: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item K.
- Y. Asbestos TEM: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item L.
- Z. Lead Abatement Projects: Refer to Specification Section 01050, Uniform Safety Standards for School Construction and Maintenance Projects; Commissioner's Regulation, Section 155.5 - Item M.

1.04 CLEANING

- A. Upon completion of all work, the Contractor shall be totally responsible for general site clean up and shall provide all labor and material required to thoroughly "broom clean" the premises throughout. This cleaning shall include, but not be limited to, the removal of all surplus material from all radiators, pipes, ducts, gypsum boards, metal work, woodwork, stairs, floors, ceilings, glass and other material and surfaces, and all surfaces which are finished shall be left in a clean and suitable condition.

1.05 REMOVAL OF TEMPORARY WORKS

- A. All temporary work such as guards, shoring, staging, etc., provided or erected by the Contractor shall be removed and shall become the property of the Contractor when such temporary work is no longer required, or when directed, or at completion of the contract.

1.06 MATERIALS, LABOR, TOOLS, WORKMANSHIP

- A. The Contractor will provide and furnish at his own expense any and all material, labor, scaffolding, tools, implements, molds, models, and cartage of every description necessary or proper to or for the duty and performance of said work and the faithful execution of his contract.

1.07 ORDERING OF SPECIFIED MATERIALS

- A. All specified materials are available from the manufacturers and some items require more time for delivery to the job than others. Therefore, to avoid the necessity of last minute substitutions because of late ordering, it will be the responsibility of the General Contractor to see that items that will require a substantial waiting period before delivery are ordered soon after the Contract is awarded.

1.08 SHUT-DOWNS

- A. The Contractor shall perform the work in a manner which will minimize shut-downs of existing operating items or systems. When the performance of the work requires the shut-down of an existing operation item or system, such shut-down shall take place only after the Contractor has given at least five working days notice and has obtained written authorization for the shut-down from the Owner. All shut-downs shall take place only on overtime, at no additional cost. This provision shall apply to all work, including testing of newly installed or altered systems.

1.09 DELIVERIES AND STORAGE

- A. All deliveries of materials or equipment must be done in conjunction with the Owner's representatives, to insure the least disruption of the facility. Storage of all materials must be approved by the Owner prior to delivery. The Owner will not accept any deliveries on

behalf of the Contractor. A Contractor's representative must be on site to accept such deliveries.

- B. Before attempting to deliver materials to the site, the Contractor shall inform the designated Owner's Representative so that arrangements can be made for places of entrance and inspection of materials being delivered.
- C. Storage of materials in the occupied building shall not be allowed unless otherwise agreed upon by the Owner's Representative. The Contractor shall be responsible for providing all storage trailers and security of same.

1.10 SPECIAL PROVISIONS

A. Contractor Representation at Construction Project Meetings:

- 1. Each Contractor shall provide qualified representation at all construction project meetings which will be held on a bi-weekly basis for the review of construction progress and coordination of all building trades. Failure of the Contractor to abide by these provisions may cause delays and incur additional expenses due to coordination difficulties.
- B. Any existing items (whether or not specified or shown on the drawings) requiring removal in order to properly complete the new work shall be removed by the Contractor performing the work and disposed of off-site at no additional charge to the Owner.
- C. Unless a specified item of removal, relocation, or installation (which appears to be in conflict with the actual site conditions) is brought to the attention of the Architect during the bidding period, the Contractor shall be responsible for the execution of said work and any related expenses incurred.
- D. Should any work or material be required which is not denoted in the Plans and Specifications, either directly or indirectly, but which is necessary for the proper execution of the intent thereof, it shall be understood and agreed that the same is implied and required and that the Contractor shall furnish all labor and material as if they were completely delineated and prescribed.
- E. Should a conflict occur between the drawings and specification and/or existing conditions, the Contractor shall be deemed to have estimated the more expensive way of accomplishing the work unless during the bidding period a clarification was requested by the Contractor and obtained in writing from the Architect, as to which method and material is to be used.
- F. Where, in these specifications, one certain kind, type, brand, or manufacture of material is named, it shall be regarded as the required minimum standard of quality and performance. Where two or more are named, these are presumed to be equal and the Contractor may select one of these items. If the Contractor desires to use any other kind, type, brand, or manufacture of material than those named in the specification, he shall submit information describing in

detail where it differs from base specifications and other information as required by the Owner.

The burden of proof of equivalence rests with the bidder. Adequate supporting information must accompany proposed substitution. The Owner or Architect reserves the right to accept or reject proposed substitutes.

- G. Any item shown on the plans but not specified or conversely specified but not shown on the plans, shall be treated as if shown or mentioned respectively in both.
- H. Alignment and adjustment of all erected steel shall be accomplished by a registered professional or land surveyor at the Contractor's expense and to the satisfaction of the Inspector.
- I. Inspection of all welded and high strength bolted field connections shall be accomplished by one of the following approved independent testing laboratories or an alternate testing company acceptable by the Owner. The Contractor shall arrange for and the Owner shall pay for all testing other than testing revealing failed results:
 - 1. All Island Testing.
 - 2. Soil Mechanics Environmental Services.
 - 3. Long Island Materials Testing Laboratories, Inc.
- J. Unless otherwise noted, each Contractor shall be responsible for their own cutting and rough patching. The General Construction Contractor shall be responsible for all finish patching and painting. All repair and patching work shall be done in a professional manner. The Contractor shall take care to match new and existing surfaces and materials as closely as possible for a continuous finish where duplication is impossible.
- K. Each Contractor shall be responsible for their own material and equipment until completely installed, inspected for completeness and correctness, and signed off by the Architect or his duly appointed representative.
- L. The General Construction Contractor shall be the lead contractor, responsible for all coordination between the General Construction, Mechanical, and Electrical trades.
- M. The General Construction Contractor shall be responsible for cutting and patching all masonry work, insulated panels, etc. to accommodate any required thru-wall piping, conduit, equipment, or ductwork penetrations by other trades.

- N. The General Contractor shall be responsible for provision of any required temporary roof drainage, protective fencing, plywood enclosure of all window and door masonry openings, etc., until new construction or material is permanently and completely in place.
- O. The General Contractor shall provide and install all flashing, counterflashing, and pitch pockets for all roof equipment and roof penetrations and install all required roof curbs provided by others in accordance with the manufacturer's approved methods.

P. Changes to the Contract:

1. Should any changes be requested or required over and above the original contract scope, the Contractor shall be compensated as follows:
 - a. For the actual and reasonable net costs for all materials and wages of applied labor required for such extra work.
 - b. Rental costs for all machinery and equipment (other than small tools) required and approved for such extra work.
 - c. 10% overhead and 5% profit as compensation for all other items of profit and cost or expense, including administration, overhead, supervision, etc. (Contractor is limited to 5% overhead for work performed by his subcontractor on changes.)
 - d. A maximum of 2% for any increase in bonds and insurance's due to the adjusted contract sum.

Q. As is usual with capital project payments, the District will retain 5 percent of each payment issued on verified requisitions for payment submitted by the Contractor. This retainage total will be paid upon satisfactory completion of all work.

R. Contractor's proposals for any additional work (whether a field condition or program change) shall be submitted for consideration as follows:

1. Labor - Number of men
Wage per hours
Number of hours
2. Material - Unit costs (no lump sums)
Unit measure (l.f., s.f., cu.ft., etc.)
3. Rental costs for machine, equipment, driver, etc.
4. 2% for bonds and insurance.
5. Upon request, the Contractor shall furnish satisfactory proof of all labor performed, materials furnished, and equipment used in performance of the extra work.

S. Whenever inclement weather (rain, hail, sleet, snow, etc.) causes an interruption in the day to day execution of the Contract work, each Contractor must fully mobilize their forces (with the necessary manpower and equipment) to immediately continue with Contract operations the very first day that such weather has subsided.

1. Contractor shall provide all necessary excavation and dewatering equipment to remove any standing water from open holes, ditches, trenches, and other excavations.

- T. The maximum gross weight of vehicles used shall not exceed 2,500 lbs. per wheel in the area of any playground or ballfields. The equipment shall be fitted with flotation type tires. On lawns, the pounds per square inch exerted on the turf-grass shall not exceed 15 lbs. per square inch and on athletic areas shall not exceed 32 pounds per square inch.
- U. See attached "Record of Unacceptable or Non-Conforming Work".

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01050 - UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION
AND MAINTENANCE PROJECTS; COMMISSIONER'S REGULATIONS, SECTION 155.5

PART 1 - GENERAL

1. Certificate of Occupancy Statement: The existing building will be occupied during construction. Throughout the duration of construction the contractor shall maintain the integrity of the existing structure. The occupied portion of any school building and required exits shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.
2. Asbestos / Lead / Polychlorinated Biphenyls Test Letter: All existing school areas to be disturbed during renovation or demolition (existing facilities building envelope components, interior finishes and concealed utility infrastructure) have been tested for lead, asbestos and Polychlorinated Biphenyls containing materials in accordance with OSHA, EPA, DEC and DOH requirements. Material test results are provided within the Project Manual. If negative for asbestos, Item 10 below does not apply. If negative for Lead, Item 11 below does not apply. If negative for Polychlorinated Biphenyls (PCB) item 12 does not apply.
3. Safety and Security Standards for Construction Projects: Throughout the duration of this construction project, the following general safety and security standards shall be maintained by all Contractors on site:
 - a. All construction materials shall be delivered during the times as stipulated by the School District. All materials shall be stored in a safe and secure manner. Locations for on-site storage shall be coordinated with the Owner's Representative.
 - b. Temporary construction fencing shall be erected around construction activity areas in accordance with Specification Section 01500. When indicated in the drawings, construction fencing will be shown on the Construction Implementation Plans. All fencing around construction activity areas shall be maintained to restrict unauthorized access and prevent students from entering site. Fencing around construction supplies or debris shall be maintained.
 - c. Gates securing construction activity areas shall be secured and locked at all times unless manned by contractor personnel to prevent unauthorized access. Signs stating "Caution - Construction Activity Area Construction Personnel Only, Unauthorized Access Prohibited" shall be posted at all entry points and 75' intervals along security fence.
 - d. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and designated with warning signs to prevent entry.
 - e. Worker Photo Identification: Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

4. Separation of Construction Areas from Occupied Spaces: Construction areas which are under the control of a Contractor and therefore not occupied by District staff or students shall be separated from occupied areas by means of temporary construction barriers. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building in accordance with Specification Section 01500. Periodic inspection and repairs of the containment barriers must be made to prevent dust or contaminants from entering occupied areas. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
 - a. A specific stairwell and/or elevator shall be assigned for construction worker use during working hours. In general, workers may not use corridors, stairs, or elevators designated for students or staff use.
 - b. Contractors shall remove large amounts of construction debris and rubbish from the building using enclosed chutes or other similar sealed system to contain dust and other particulate. No material shall be dropped or thrown outside the walls of the building. Removal of construction debris and rubbish shall be through construction areas only, there shall be no movement of debris through halls of occupied spaces of the building.
 - c. Dust and debris generated by construction activities in occupied parts of the building shall be cleaned by the Contractor at the close of each workday in accordance the General Requirements of Division 1, Section 1B and Specification Section 01015. The Contractor is responsible to maintain all health, safety, public address systems and educational capabilities of occupied areas within the school building at all times that classes are in session.
5. Exiting Plan: A plan showing how exits required by NYS Building Code will be maintained. This is typically shown within CIP and/or Code Compliance Plans.
6. Ventilation During Construction: A plan showing how required ventilation will be maintained during construction. This is typically shown within CIP and/or Code Compliance Plans.
7. Construction Noise: Construction and maintenance operations shall not produce noise in excess of 60 DBA in occupied spaces, or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical treatments shall be placed so as to abate the excessive noise levels. Acoustic treatments shall be prescribed by the Architect and supplied and installed by the Contractor.
8. Construction Fume Control: The Contractor shall be responsible for the control of chemical fumes, gasses and other contaminates produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes.
9. Off-Gassing Control: The Contractor shall be responsible for ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall

covering, drapery, etc. are scheduled, cured, or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

10. Asbestos Code Rule 56 Compliance: Where so indicated by positive test results, portions of the project may entail the removal of asbestos containing material as defined by 12NYCRR56. Large and small asbestos abatement projects (as defined by 8 NYCRR 155.5(k)) shall not be performed while the building is occupied. (Definition of "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction.) The isolated portions (the occupied portion and the portion under construction) of the building must contain separate code compliant exits. The ventilation systems must be physically separated and sealed at the isolation barrier(s).

Removal of asbestos containing material shall only be performed when the building, as defined above, is unoccupied. The Contractor shall verify that the building has been vacated prior to commencing asbestos abatement work. If the building is configured such that the affected area can be completely isolated from the unaffected areas with sealed non-combustible construction barriers, then the unaffected areas can remain occupied provided required exits are maintained independently in both areas.

Removal of asbestos containing materials on the exterior of the building such as flashing, roofing, siding or soffit and caulking may be performed on occupied buildings provided all variances have been granted and the occupants have been notified of the intention to remove asbestos containing material. Complete isolation of ventilation systems supplying the occupied spaces and windows must be maintained throughout the removal duration.

Asbestos TEM: Where so indicated by positive test results, the asbestos abatement area shall be completely sealed off from the rest of the building and completely cleaned and tested by TEM prior to re-entry by the public.

11. Lead Abatement Projects: At interior painted surfaces which have tested Positive for Lead: Portions of walls that will be disturbed as a requirement of this contract shall be removed in accordance with the Lead Safety Plan included within the Project Manual. This section clearly references OSHA regulations to be followed, and clean-up and testing associated with lead abatement must be done in strict conformance with HUD protocol. Locations where construction activity requires the removal of lead containing materials shall be completely isolated from occupied portions of the building using a construction barrier. The Contractor shall have all surrounding areas tested for lead levels prior to commencing work and after work has been completed to ensure that surrounding areas have not been contaminated by removals.
12. PCB Projects: Any window caulking tested and found to contain PCBs must be removed in accordance with U.S. EPA regulations under the Toxic Substances Control Act (40 CFR 761.62). Soil areas adjacent to windows containing PCBs must follow the 40 CFR 761.62 criteria. A site-specific abatement plan must be developed to address potential environmental and public health concerns. Steps for abating contamination and preventing contamination of nearby areas must be done in accordance with HUD Technical Guidelines for the Evaluating and Control of Lead Based Paint Hazards in Housing.

Removal of PCB containing materials on the exterior of the building such as caulking may be performed on occupied buildings provided all variances have been granted and the occupants have been notified of the intention to remove PCB containing material. Complete isolation of ventilation systems supplying the occupied spaces and windows must be maintained throughout the removal duration.

13. Fire Prevention: Any holes in floors or walls shall be sealed with a fire-resistant material whose rating meets or exceeds that of the construction to which it is attached.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01070 - ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section lists and defines various common abbreviations which are used throughout the Contract Documents.
- B. Abbreviations of organizations and federal agencies which publish standards, codes, and regulations are defined in section 01060 - CODES AND STANDARDS.
- C. Other abbreviations and symbols may be found in legends and elsewhere on the Drawings. Piping material abbreviations are contained in the piping sections.
- D. Should an abbreviation or symbol not be specifically defined, it shall carry the standard definition commonly used in the industry.
- E. Whenever any doubt arises as to what an abbreviation or symbol means, notify Engineer and he will issue a definition in writing.

1.02 ABBREVIATIONS

- A. The following is a list of commonly used abbreviations which may be found in the Contract Documents, and the meanings ascribed to them:

A.C. or ac	Alternating Current
a or A	Amperes
AFF	Above Finished Floor
amp or Amp	Amperes
Alum.	Aluminum
Asph.	Asphalt
AWG.	American Wire Gauge
Aux.	Auxiliary
Bit. Conc.	Bituminous Concrete
CB	Circuit Breaker
Cl.	Class
cm	Centimeter
C.O.	Clean out
Conc.	Concrete
Cont.	Continuous
Cu.	Cubic
cc	Cubic Centimeters
C.F.	Cubic Feet
CFM or cfm	Cubic Feet Per Minute
CFS or cfs	Cubic Feet Per Second
C.Y.	Cubic Yards
CT	Current Transformer
D.C. or dc	Direct Current
DFT.	Dry Film Thickness

Dia.	Diameter
DWG. or Dwg.	Drawing
Dr.	Drive
Ea. or ea.	Each
EF	Each Face
EW	Each Way
Eff. or eff.	Efficiency
El. or Elev.	Elevation
Fin. Gr.	Finished Grade
fps	Feet Per Second
Ft. or ft.	Feet
ftg.	Footing
g.	Grams
Ga. or ga.	Gauge
Gal. or gal.	Gallon
Galv.	Galvanized
GPD or gpd	Gallons Per Day
GPM or gpm	Gallons Per Minute
H-O-A	Hand-off-automatic
Hz. or hz	Hertz
I.D.	Inside Diameter
Inv.	Invert
KVA or kva	Kilovolts-amperes
Kw or kw	Kilowatts
kwh or KWH	Kilowatt-hours
Lbs. or lbs.	Pounds
L.F.	Linear Feet
LPA	Lighting Panel "A"
L.S.	Lump Sum
m.	Meters
mA	Milliamperes
Max. or max.	Maximum
MCC	Motor Control Center
mg.	Milligrams
MGD or mgd	Million Gallons Per Day
mi.	Miles
Min. or min	Minimum
mm	Millimeters
No. or no.	Number
nom.	Nominal
N.T.S.	Not To Scale
O.D.	Outside Diameter
O & M	Operations and maintenance
Oz. or oz.	Ounce
pb	Pushbutton
PPD	Pounds Per Day
P/B	Pullbox
pri.	Primary
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch,
psig	Pounds Per Square Inch, Gauge Pressure
PT	Potential Transformer
Pvt. or Pvmt.	Pavement
R.	Radius
R.O.W.	Right-of-Way

Sch.	Schedule
sec.	Secondary or Seconds
S.F.	Square Feet
S/S/P/	Stop-start-pilot Station
Std. or std.	Standard
S.Y.	Square Yards
T&B	Top and Bottom
Typ.	Typical
U.O.N.	Unless Otherwise Noted
U.V.	Ultraviolet
V or v	Volts
Vac or VAC	Alternating current Voltage
Vdc or VDC	Direct Current Voltage
V.F.	Vertical Feet
Vol.	Volume
W or w	Watts
Yd. or yd.	Yards

1.03 SYMBOLS

- A. The following is a list of commonly used symbols which may be found in the Contract Documents, and the meanings ascribed to them:

P	Phase, Diameter, or Round (as applicable)
D	Degrees (F. = Fahrenheit C. = Centigrade)
'	Feet or Minutes
"	Inches or Seconds
#	Number or Pound
/	Per or Divided by

PART 2 - EXECUTION

(NOT UTILIZED)

PART 3 - EXECUTION

(NOT UTILIZED)

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01085 - APPLICABLE STANDARDS

PART ONE - GENERAL

1.01 GENERAL:

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and type of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship, which meet or exceed the specifically named code or standard.
3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

1.02 QUALITY ASSURANCE:

- A. Familiarity with pertinent codes and standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements.
- B. Rejection of non-complying items: The Architect reserves the right to reject items incorporated into the Work, which fail to meet the specified minimum requirements. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to and adjustment in the Contract Amount as approved by the Architect and the Owner.
- C. Applicable standards listed in these Specifications include, but not necessarily limited to, standards promulgated by the following agencies and organizations:
 1. AASHTO: American Association of State Highway and Transportation Officials, 342 National Press Building, Washington, D.C. 20004.
 2. ACI: American Concrete Institute, Box 19150, Redford Station, Detroit, MI 48129.

3. AISC: American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, NY 10020.
4. ANSI: American national Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, NY 10018.
5. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
6. AWS: American Welding Society, Inc., 2501 N. W. 7th Street, Miami, FL 33125.
7. AWWA: American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, CO 80235.
8. CRSI: Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, IL 60610.
9. CS: Commercial Standard of NBS, J.S., Department of Commerce Government Printing Office, Washington, D.C. 20402.
10. DHHS: Department of Health and Human Services, 26 Federal Plaza, New York, NY 10007 (212) 264-2560
11. EPA: Environmental Protection Agency Region II, 26 Federal Plaza, NY, NY 10007 Asbestos Coordinator - Room 802 (212) 264-7307

Part 61, Sub-Part M
National Air Emissions Standards for Hazardous
Air Pollutants (NESHAP)
40 CFR Part 763, Subpart E
Asbestos Hazard Emergency Response Act (AHERA)

12. FED. SPECS.: Specifications Sales (3F21) Bldg. 197, Washington Navy Yard, GS, Washington, DE 20407
13. FGMA: Flat Glass Marketing Association, 3310
14. NAAMM: National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, IL 60302.
15. NEC: National Electrical Code (see NFPA).
16. NEMA: National Electrical Manufacturers Association, 155 East 44th Street, New York, NY 10017.
17. NFPA: National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
18. NIOSH: National Institute for Occupational Safety and Health, 26 Federal Plaza, New York, NY 10007, (212) 264-2485
19. OSHA: Occupational Safety/Health Administration, New York Regional Office, 1515 Broadway, NY, NY 10036, Room 3445 (212) 944-3426

20. SDI: Steel Deck Institute, 135 Addison Avenue, Elmhurst, IL 60125.
21. SED/SLD: State Education Department and State Labor Department
22. SSPC: Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, PA 15213.
23. TCA: Tile Council of America, Inc., P. O. Box 326, Princeton, NJ 08540.
24. UL: Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611.
25. Fed Specs and Fed Standards: Specifications Sales (3FRI), Bldg. 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.
26. MIL-SPECS: Military Specifications, Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.
27. UBC: Uniform Building Code, International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01230 - CONSTRUCTION PHASE CLARIFICATIONS -
REQUESTS FOR INFORMATION FROM ARCHITECT'S OFFICE

PART 1 - GENERAL

1.01 SUBMISSION OF ARCHITECT'S RFI FORM:

- A. In addition to the requirements of General Conditions, Articles 1.1.10, 1.1.11, 1.26, 3.12, 4.2, 4.3, 4.4, 7.1, 7.2, 7.3, 7.4, 7.5 and 13.4 (and all other Articles as deemed applicable by the Architect), each Prime Contractor shall comply with the following wherever it applies to the work of his contract:
1. Each Prime Contractor shall prepare and submit, on the Architect's attached form (see last page of this specification section), an original Request For Information (RFI) to Architect's Office, for all questions which may arise during post-bid award activities which are to be directed to the office of the Architect. This form shall be submitted before commencement of any work, which may be in question. (Commencement of work in question shall constitute complete acceptance of field conditions and necessary remedial repairs as directed by the Architect, and work shall be conducted at no additional charges to the Owner.) The RFI form shall indicate, at the bare minimum, the following information:
 - a. Date of Request and RFI number.
 - b. Project Name and Project Number: reflecting title sheet information, including SED number.
 - c. Attention of: Name of Architect in Charge/Project Director/Project Manager.
 - d. From: Name of submitting Prime Contractor representative, including his project title, office or field office phone number, and fax number.
 - e. Trade: The Prime Contract, which is being represented.
 - f. Date Information Required By: Fill in exact date information is required. "ASAP" or "IMMEDIATELY" will not be acknowledged by the Architect's office.
 - g. Detailed description of requested item.
 2. Note to all Prime Contractors: *Request For Information forms shall be used for requests, clarifications, or questions on contract drawings and specifications, **not** contract terms, scheduling items, or general correspondence, or as a means to describe or request approval of alternate construction means and methods, concepts, substitutions, materials, or systems. Each individual Prime Contractor is to fill out the Architect's RFI form completely (leaving no blanks) and send them DIRECTLY*

via fax to the Architect's Office, with a concurrent copy to the Construction Manager's office. Neither the Architect nor the Construction Manager will be filling out these forms on your behalf, but they will be working with each other and the Owner to answer such RFIs. Incomplete RFI forms will not be logged in, and will be discarded. It shall not be the Architect's responsibility to contact any Prime Contractor submitting RFIs to verify their completeness or accuracy.

- B. RFI Log: Each Prime Contractor shall be responsible to generate an RFI log, to be updated and submitted weekly to the Architect and the Construction Manager. Examples of acceptable log format can be obtained from the office of the Construction Manager. Log shall include, at bare minimum, the following items:
- a. Date of submittal to Architect's office, and method of transmittal.
 - b. Date of response from Architect's office.
 - c. If not yet responded to, number of days since submittal.
 - d. In Prime Contractor's opinion, list of affected trades impacted by the results.

1.02 LIMITATIONS:

- A. Requests for information shall be made in full accordance with A.I.A. Standard Document B141-1997 (Standard Form of Agreement Between Owner and Architect), Article 2.6, Contract Administration Services, Items 2.6.1.5, 2.6.1.6, and 2.6.1.7. The Architect agrees to the following actions with regard to "Requests For Information" which are received by his office:
1. The Architect shall review properly prepared, timely requests by the Contractor for additional information about the contract documents. A properly prepared Request for Additional Information about the Contract Documents shall be in a form prepared or approved by the Architect, and shall include a detailed written statement that indicates the specific drawings or specifications in need of clarification and the nature of the clarification requested (A.I.A. B-141-2.6.1.5).
 2. If deemed appropriate by the Architect, the Architect shall, on the Owner's behalf, prepare, reproduce, and distribute supplemental drawings and specifications in response to Request For Information by the Contractor (A.I.A. B-141-2.6.1.6).
 3. The Architect shall interpret and decide matters concerning performance of the Owner and Contractor under, and requirements of, the contract documents on written request of either the Owner or Contractor. The Architect's response to such requests shall be made in writing within any time limits agreed upon or otherwise with reasonable promptness (A.I.A. B-141-2.6.1.7).

4. Based upon the amount of RFIs received, and their content, unless otherwise so indicated on the RFI, the Architect shall establish the level of importance of said RFIs, and shall be allowed sufficient time in the Architect's professional judgement to permit adequate review. Prior to submitting any RFIs, each Prime Contractor shall use their individual discretion in determining whether or not an RFI format or verbal format be used to resolve said situation.
5. In the event of multiple sequential RFIs received same day at the Architect's office, *unless they are specifically numbered by the Prime Contractor for their order of relative importance*, they will be reviewed either: a) in the time order in which they were received by the Architect's office, b) in their natural progressive order of construction placement, or c) in order of preference, as determined by the Architect.
6. As a result of multiple sequential RFI submission, no delays in time, or Prime Contractor hard or soft costs shall be implied or imposed onto the Architect. It is the Prime Contractor's complete responsibility to adhere to the prepared Construction Schedule at all costs, including extended delays, which may be incurred by time required for RFI responses from the Architect's office.
7. Should an answer be required 'immediately', the Prime Contractor shall simply place an asterisk by the date required to call attention to such a fact. He shall coordinate his own work forces accordingly to allow the Architect proper review and analysis time for resolution of such 'immediate' problems.
8. *It shall be the Prime Contractor's complete responsibility* to document any verbal responses, into either follow-up RFI submittals or formal letters (on company logo stationery) to the Architect's office. Upon receipt, the Architect will review and make modifications to the correspondence if it varies in content from the Architect's interpretation. This will eliminate confusion or misunderstandings made in verbal form.
9. The Architect shall be the sole interpreter of all RFI validity, as the RFI is based on products of service produced by the Architect's office. The Architect reserves the right to reject any and all RFIs deemed frivolous or trivial.
10. As work in question is directed to the Architect for his sole response, only the attached Architect's RFI form will be considered as final and binding.

1.03 LOG-IN PROCEDURE FOR ALL RFI REQUESTS

- A. Log-in procedures are based on the normal business hours of the Architect's office, and **will not be modified for any reason**. The Architect's normal business hours are 8:00 a.m. to 5:00 p.m., EST, Monday through Friday. **All RFIs shall be reviewed by the Architect's office during normal business hours**. The Architect's office is closed on the following legal holidays: New Year's Day, President's Day, Memorial Day, Labor Day, Thanksgiving Day and the day following, and Christmas Day. **Under no circumstances shall the Architect's office be considered or assumed as open for business on Saturdays, Sundays, or legal holidays**.
- B. Any RFIs, which are received between 8:00 a.m. and 2:59:59 p.m. on a normal business day, will be received and logged in as received on that business day. Any RFIs, which are received and logged in by the Architect's Office at 3:00 p.m. or later (Eastern Standard Time) on a normal business day shall be considered as received at 8:00 a.m. the following business day. Any RFIs received by the Architect's office at or after 3:00 p.m. on Fridays will be logged in as received at 8:00 a.m. on the next following business day (Monday). In the case of the following calendar day being a holiday, the RFI shall be considered as received on the next non-holiday business day at 8:00 a.m. **All receipt times shall be as determined by the received time stamped and signed in by the Architect's office**.

1.04 PROPER SEQUENCING OF RFI SUBMISSIONS

- A. It is the Prime Contractor's sole responsibility to fully coordinate submission of RFI forms with shop drawing and technical data submittals made or yet to be made. The Prime Contractor must coordinate each RFI with requirements of work and the contract documents.
- B. The Prime Contractor's responsibility for deviations in submissions from requirements of contract documents is not relieved by Architect/Engineer's review of RFIs or associated submissions, unless the Architect gives written acceptance of specific deviations.
- C. The Prime Contractor's responsibility for errors and omissions in submissions or RFIs is not relieved by the Architect's review of submissions or RFIs.
- D. In conformance with Section 01300 - Submissions, notify the Architect in writing at time of shop drawing/technical data submission of deviations in submissions from requirements of contract documents. Do not wait until RFI is prepared to inform the Architect's office of planned deviations.
- E. Similar to Section 01300 - Submissions, no portion of the work requiring RFI clarifications shall be started, fabricated, or installed until return of Architect's formal response, including any supplemental information the Architect deems relevant for clarification.
- F. After response to RFI, the affected Prime Contractor shall distribute copies of the RFI responses to all parties requiring

same for coordinating all subsequent work. The Architect's only responsibility shall be to supply one copy of each RFI resolution to: the Construction Manager, the Owner, and the affected Prime Contractor who initiated the RFI.

- G. The affected Prime Contractor shall make required copies of all RFI resolutions for distribution to all affected parties immediately upon receipt and review of same.

1.05 AFFECT OF RFI RESPONSES ON THE PRIME CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. All Prime Contractors shall note well that the Architect is not legally bound to their approved construction schedules; the Prime Contractors are the only parties legally bound therein. The Architect is not required to expedite any reviews or comments in the effort to expedite the Prime Contractors' submission and/or construction schedules. Therefore, time delays created by the Architect's required review time of each RFI shall be absorbed into the Prime Contractor's work schedule accordingly. This may necessitate such Prime Contractor measures as: multiple work crews, off-hour or weekend construction by the affected Prime Contractor(s), to be completed at no additional costs to the Owner. For this reason, it is imperative that each Prime Contractor carefully review all documents as early as possible, in order to issue RFIs by the earliest possible date.
- B. Any RFIs which are relative to an alteration, to the approved contractual details, or specifications will be specifically referred to the Architect's office with relative time differences noted. Any additional time required for alterations, if RFIs are approved, shall have all additional costs (if any) absorbed directly by the Prime Contractor affected. ***Should other Prime Contractors be directly affected in either labor, material, or equipment costs, their additional costs shall be borne by the Prime Contractor who initiated the RFI.***

1.06 AFFECT OF RFI FORMS ON CONTRACTOR PREPARATION, AND PREPARATION OF SHOP DRAWINGS, SAMPLES, MANUFACTURER'S DATA, ETC.

- A. It is the responsibility of the Contractor furnishing and/or installing materials and/or systems to these projects to field verify all existing and/or as-built conditions, as well as all conditions presently under construction that are interrelated in whole or in part to the furnishing and/or installing of such materials and/or systems. Submissions of RFI forms are at the sole discretion of each Prime Contractor.
- B. It is the responsibility of each Prime Contractor to coordinate such field verification and be ultimately responsible for the accuracy of same prior to the submission of any RFI forms or shop drawings for design intent review by the Architect/Engineer.
- C. Similar to submittal information indicated in Section 01300 - Submissions, all RFIs initiated by any subcontractor and/or supplier of the Prime Contractor and/or supplier of the Prime Contractor or by the Prime Contractor themselves shall be reviewed by and shall be deemed officially submitted by the Prime Contractor. All RFIs shall be thoroughly checked by the Prime Contractor prior to the submission of same to the Architect's office for: contract document accuracy, validity and/or equivalency (if applicable); total quantity of material provided; all dimensioning systems related; alteration to same if necessary to accommodate accepted field changes built or pending; interaction with other materials and/or systems furnished and/or installed by this Prime Contractor or their subcontractors (i.e., field measurements for space allocation,

accuracy to previous submittals of this Prime Contractor, etc.); and interaction with materials and/or systems provided by other Prime Contractors.

- D. After the completion of applicable RFIs, when submitting subsequent revised technical data or revised shop drawings, the Prime Contractor shall signify same on subsequent submittal by having the following information on each and every submittal:
- ☐ Name of Prime Contractor
 - ☐ Date of Review by Prime Contractor
 - ☐ Note: This submittal has been reviewed by (Name of Prime Contractor) in accordance with the contract documents describing and defining the requirements of such review, with affected RFI number attached.
 - ☐ Copy of approved RFI, indicating Architect's final comments.
 - ☐ Signature of Prime Contractor's reviewer.
 - ☐ Name of Prime Contractor's reviewer (printed).
 - ☐ Title of Prime Contractor's reviewer (printed).
- E. The Prime Contractor shall submit in writing to the Architect and Construction Manager, prior to their relevant revised or initial submissions, the name and title of the reviewer who shall be an employee of the Prime Contractor for review and acknowledgment of same, along with the recommended RFI from the Architect's office.
- F. As this project has a Construction Manager who is acting on the Owner's behalf and who has full-time construction site representation, the scheduling of all RFIs, submissions, the coordination, and interaction of other prime contractors, field conditions that affect the submission of, fabrication of, or installation of another Prime Contractor's submission, fabrication, or installation shall be made known to the Owner's Representative. Refer to Section 01300 - Submissions for additional relevant information.
- G. Any resultant construction field condition that arises that is contrary to an RFI or submission made, that is conflicting with another Prime Contractor's submission, the schedule for construction, or with another Prime Contractor's constructed work shall be immediately identified by the Prime Contractor(s) and made known to the Owner's Representative. If such condition causes any construction schedule delay, "rereview" by the Architect/Engineer, additional work of the Architect/Engineer (such as field review, "redesign" or document preparation); or "reconstruction" of any work already built and/or accomplished by another Prime Contractor, the connection to such conditions (and any associated costs to accomplish same) shall be the sole responsibility of the Prime Contractor found negligent in causing such conditions.
- H. Any RFI not containing complete information outlined and required as indicated within the above subsections will not be reviewed by the Architect for design intent, but rather rejected and discarded, so all Prime Contractors must insure that no blanks are left on their submitted RFIs. All time lost as a result of this error will be the sole responsibility of the Prime Contractor who made the error.

- I. Any RFI submitted by the Prime Contractor that requires subsequent coordination with another material and/or system provided by this Prime Contractor or another Prime Contractor that has been reviewed, by that Prime Contractor and previously submitted to the Architect may be rejected in whole or part by the Architect, or held in abeyance by same until the corresponding and coordinating submittals are submitted as the concurrent review of all such submittals for design intent, may be deemed important by the Architect. Any release given any entity other than the Architect to fabricate, furnish, and install any material or system not reviewed by the Architect for design intent shall become the sole responsibility of the releasing entity as well as the resolution of construction related issues or conflicts, relative to approved or disapproved RFIs.
- J. In addition, the Prime Contractor shall not utilize nor refer to any schedule of work not created nor provided by the Architect. The Prime Contractor's method in establishing, defining, and/or substantiating their ability to maintain the schedule presented in these contract documents and as prepared by the Owner's representative shall be exclusive of a defined time period of submittal review, and shall not be dependent upon RFI approval or time delays incurred.
- K. Similar to Item 1.03L of Section 01300 - Submissions, the rejection or abeyance noted in the above subparagraph shall not be considered a delay or a reason for an extension of time in the construction schedule to the contract, as such cause for same shall have been brought upon by the Prime Contractor not providing the "pre-coordination" necessary for such submissions.

PART TWO - PRODUCTS

Not Applicable.

PART THREE - EXECUTION

Not Applicable.

END OF SECTION

REQUEST FOR INFORMATION

RFI No.:

Date:

Project:

BBS Project No.:

Location:

To The Attention of :

Company:

Requested BY:

Trade:

Phone:

Fax:

Date Information Required By:

Description:

Spec Section/ Dwg:

Reply:

BY:

FIRM: BBS Architects, Landscape Architects & Engineers, P.C.

DATE:

If a "Request for Information" is deemed relevant and appropriate by the Architect, the Architect's response to such requests shall be made in writing within any time limits agreed upon or otherwise with reasonable promptness. Upon evaluation of the Prime Contractor's request and if deemed necessary, the Architect's response may include supplemental drawings and specifications.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01300 - SUBMISSIONS

PART 1 - GENERAL

1.01 SHOP DRAWINGS, PRODUCT DATA, MANUFACTURER'S WARRANTIES, AND SAMPLES:

- A. In addition to the requirements of General Conditions, Article 3.12, each Prime Contractor shall comply with the following wherever it applies to the work of his contract:
1. Prepare and submit, with construction schedule, a separate schedule for shop drawings, product data, and samples submittals, which shall be herein referred to as a "Submittal Log". This log shall list all required submittals specific to your trade as detailed in the various sections of the Project Specifications. Submittal log shall be submitted within one (1) calendar week of Notice to Proceed, before submitting first payment application. Submittal log shall show the following:
 - a. Section number.
 - b. Item of shop drawing, product data, and samples.
 - c. Date to be submitted.
 2. Shop drawings: Original drawing, prepared by Prime Contractor, subcontractor, supplier, or distributor, which illustrates some portion of the work; showing fabrication, layout, setting or erection details.
 - a. Identify details by reference to sheet and detail numbers shown on contract drawings.
 - b. Sheet size, multiple of 8-1/2" x 11", not to exceed size of contract drawings when unfolded.
 - c. Reproductions for submittals: One (1) reproducible transparency with seven (7) opaque diazo prints.
 - d. Photographic reproductions of contract drawings will not be accepted as shop drawings and will be rejected.
 3. Product Data:
 - a. Manufacturer's standard schematic drawings:
 1. Modify drawings to delete information which is not applicable.
 2. Supplement standard to provide additional information applicable to the project.
 - b. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

1. Clearly mark each copy to identify applicable materials products, or models.
 2. Show dimensions and clearances required.
 3. Show performance characteristics and capacities.
- c. Latest edition of manufacturer's applicable instructions and recommendations for installation of product.
4. Manufacturer's Warranties:
 - a. The Contractor shall include in his submissions samples of all manufacturer's warranties indicating the correct time duration of the warranty as specified in the contract documents. If the documents do not specify a specific time duration, the manufacturer's standard time duration shall apply, but in no event shall it be less than the contractor's guarantee as specified in Section 01700.
5. Samples: Physical examples to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged.
 - a. Office samples to be sufficient size and quantity to clearly illustrate:
 1. Functional characteristics of product or material, with related parts and method of attachment.
 2. Full range of color samples.
 - b. Field samples and mock-ups, as specified in technical sections.
 1. Erect on project site at location acceptable to Architect/Engineer.
 2. Construct samples or mock-up complete, including work of all trades required in finish work.
6. The Architect refers to A.I.A. Document B141-1997, *Standard Form of Agreement Between Owner and Architect*, and has based the submittals procedure on said document.

1.02 PRIME CONTRACTOR RESPONSIBILITIES:

- A. All submissions are to be made directly to the Architect's office. Each Prime Contractor shall completely review, stamp, and sign his shop drawings, product data, and samples prior to submission to Architect. The Architect will not review any shop drawings unless first reviewed by Prime Contractor. Refer to 1.04G "Concurrent Submittals" for copies to be forwarded concurrently to the Construction Manager.

- B. Verify:
1. Field measurements.
 2. Field construction criteria.
 3. Catalog numbers and other data.
- C. Coordinate each submission with requirements of work and contract documents. Prime Contractor shall exercise professional judgement to adequately address time gaps between submissions, Architect's/Engineer's review time, resubmission time, fabrication, procurement and long-lead purchases, and on-site priorities which dictate installation times.
- D. Each Prime Contractor will be responsible to send all shop drawings and technical submittals to the Architect's office via Federal Express Overnight Priority Delivery, or other comparable delivery services.
- E. Each Prime Contractor is responsible to supply the proper number of copies for all submissions, including samples, color boards, etc. The Architect has the right to reject and return any submissions made which do not conform to the requirements indicated herein.
- F. Prime Contractor's responsibility for errors and omissions in submissions is not relieved by Architect/Engineer's review of submissions.
- G. Prime Contractor's responsibility for deviations in submissions from requirements of contract documents is not relieved by Architect/Engineer's review of submissions unless Architect/Engineer gives written acceptance of specific deviations.
- H. All submissions shall be accompanied by a **Letter of Transmittal**, signed by the Prime Contractor's project manager. Notify Architect/Engineer, in writing at time of submission of deviations in submissions from requirements of contract documents. In addition, all submittals shall be accompanied by a signed and dated "**Submittal Cover Sheet**" for each item, which acknowledges the Prime Contractors review for completeness, correctness and accuracy of each submitted item.
- I. No portion of the work requiring submissions shall be started, fabricated, or installed until return of approved submissions to the prime contractor.
- J. After Architect review, distribute copies of submissions to parties requiring same for coordinating of work.
- K. Make required copies for distribution of shop drawings, and product data, that has been stamped and signed by the Architect.

1.03 CONTRACTOR PREPARATION, REVIEW, AND SUBMISSION OF SHOP DRAWINGS, SAMPLES, MANUFACTURER'S DATA, ETC.

- A. It is the responsibility of the Contractor furnishing and/or installing materials and/or systems to these projects to field verify all existing and/or as-built conditions, as well as all conditions presently under construction that are interrelated in whole or in part to the furnishing and/or installing of such materials and/or systems.
- B. It is the responsibility of the Prime Contractor, to coordinate such field verification and be ultimately responsible for the accuracy of same prior to the submission of shop drawings for design intent review by the Architect/Engineer.
- C. All submittals of shop drawings, materials, samples, etc. prepared by any subcontractor and/or supplier of the Prime Contractor or by the Prime Contractor themselves shall be reviewed by the Prime Contractor, prior to the submission of same to the Architect/Engineer, for: contract document accuracy and equivalency (if applicable); total quantity of material provided; all dimensioning systems related; alteration to same if necessary to accommodate accepted field changes built or pending; interaction with other materials and/or systems furnished and/or installed by this Prime Contractor or their subcontractors (i.e., field measurements for space allocation, accuracy to previous submittals of this Prime Contractor, etc.); and interaction with materials and/or systems provided by other Prime Contractors.
- D. After the completion of such review as stated in 1.03C above, the Prime Contractor shall signify same by having the following information on each and every submittal:
- Name of Prime Contractor
 - Date of Review by Prime Contractor
 - Note: This submittal has been reviewed by (Name of Prime Contractor) in accordance with the contract documents describing and defining the requirements of such review.
 - Signature of reviewer.
 - Name of reviewer (printed).
 - Title of reviewer (printed).
- E. In compliance with 1.03D above, the Prime Contractor shall submit in writing to the Architect/Engineer and Owner's representative (if any), prior to their first submission, the name and title of the reviewer who shall be an employee of the Prime Contractor for review and acknowledgment of same.
- F. As this project has a Construction Manager who is acting on the Owner's behalf and who has full-time construction site representation, the scheduling of submissions, the coordination, and interaction of other prime contractors, field conditions that affect the submission of, fabrication of, or installation of another Prime Contractor's submission, fabrication, or installation shall be made known to the Owner's Representative.
- G. Any resultant construction field condition that arises that is contrary to a submission made, that is conflicting with another Prime Contractor's submission, the schedule for construction, or

with another Prime Contractor's constructed work shall be immediately identified by the Prime Contractor(s) and make known to the Owner's Representative, and, if such condition causes any construction schedule delay, "rereview" by the Architect/Engineer, additional work of the Architect/Engineer (such as field review, "redesign" or document preparation); or "reconstruction" of any work already built and/or accomplished by another Prime Contractor, the connection to such conditions and associated costs to accomplish same shall be the sole responsibility of the Prime Contractor found negligent in causing such conditions.

- H. No submission to the Architect/Engineer shall contain or utilize directly portions whole or in part of the contract documents, such as the reproduction of drawings, portions of the Project Manual, etc.
- I. The Architect's office reserves the right to retain any submitted technical data and shop drawings in abeyance if: submissions are incomplete, improper number of samples are submitted, if submissions are not accompanied by a properly-executed submittal cover sheet/letter of transmittal, or until all associated/interrelated shop drawings or interrelated technical data are submitted. See "K" below.
- J. Any submission not containing the information outlined and required in 1.03D above will not be reviewed by the Architect/Engineer for design intent, but rather rejected and sent back to the Prime Contractor for review by same.
- K. Any submission by the Prime Contractor that requires coordination with another material and/or system provided by this Prime Contractor or another Prime Contractor that has been reviewed, by that Prime Contractor and previously submitted to the Architect/Engineer may be rejected in whole or part by the Architect/Engineer, or held in abeyance by same until the corresponding and coordinating submittals are submitted as the concurrent review of all such submittals for design intent, may be deemed important by the Architect/Engineer. Any release given any entity other than the Architect/Engineer to fabricate, furnish, and install any material or system not reviewed by the Architect/Engineer for design intent shall become the sole responsibility of the releasing entity as well as the resolution of construction related issues or conflicts.
- L. In addition, the Prime Contractor shall not utilize nor refer to any schedule of work not created nor provided by the Architect/Engineer. The Prime Contractor's method in establishing, defining, and/or substantiating their ability to maintain the schedule presented in these contract documents and as prepared by the Owner's representative shall be exclusive of a defined time period of submittal review.
- M. The rejection or abeyance noted in the above subparagraph shall not be considered a delay or a reason for an extension of time in the construction schedule to the contract, as such cause for same shall have been brought upon by the Prime Contractor not providing the "pre-coordination" necessary for such submissions.

- N. The Architect is not legally bound to the approved construction schedule; only the Prime Contractors are bound to the approved construction schedule. The Architect is not required to expedite reviews or comments in the effort to expedite any Prime Contractors' submissions and/or construction schedule.

1.04 SUBMISSION REQUIREMENTS:

- A. Submit eight (8) copies of product data.
- B. Submit one (1) reproducible transparency (sepia) and seven (7) prints.
- C. Submit three (3) samples specified in each technical section.
- D. All specification/product data catalogue cuts submitted by the Prime Contractor(s) to the Architect's office for approval and processing shall be accompanied by a signed and dated "Submittal Cover Sheet", which shall acknowledge the Prime Contractor's receipt, completeness and correctness of the submitted material. A Letter of Transmittal shall accompany all submissions, and it shall contain:
1. Date of submission.
 2. Architect/Engineer's project title and project number (include all extensions).
 3. Attention of: name of Architect's designated project representative.
 4. Prime Contractor's name and address.
 5. Notification of deviations from contract documents.
 6. Any additional pertinent data.
- E. Submissions shall include:
1. Date and revision dates.
 2. Architect/Engineer's project title and number.
 3. The Names of:
 - a. Architect/Engineer.
 - b. Prime Contractor.
 - c. Subcontractor.
 - d. Supplier.
 - e. Manufacturer.
 4. Identification of product.

5. Relation to adjacent structure or materials.
 6. Field dimensions, clearly identified as such/
 7. Technical specification section number.
 8. Applicable standards.
 9. A blank space 4" x 4", for the Architect/Engineer's stamp.
 10. Identification of deviations from contract documents.
 11. Prime Contractor's stamp, initialed or signed, certifying to review of submission, verification of field measurements and compliance with contract documents.
- F. Catalog Data:
1. Submit catalog data with a "Catalog Data" cover sheet with information as listed in paragraph 1.03, F., above.
- G. Concurrent Submittals: In addition to submitting the above to the Architect's office, the Prime Contractor will also send, concurrently, one (1) copy of drawing/cuts simultaneously to the Construction Manager.

1.05 RESUBMISSION REQUIREMENTS:

- A. Shop Drawings:
1. Revise initial drawings as required and resubmit as specified for initial submission.
 2. Indicate on drawings any changes which have been made other than those requested by the Architect/Engineer.
- B. Product Data and Samples:
1. Submit new data and samples as required for initial submission.

1.06 DISTRIBUTION OF SUBMISSIONS:

- A. Prime Contractor shall distribute copies of shop drawings, product data, and/or samples which carry the Architect/Engineer approval stamp to:
1. Prime Contractor's file (as required).
 2. Job site file (as required).
 3. Record document file (as required).
 4. Other prime contractors, as required for coordination (as required).
 5. Subcontractor (as required).

- 6. Suppliers and Fabricators (as required)
- 7. The Construction Manager (2 copies).
- B. Distribute samples as directed, by Architect/Engineer.
- C. The Prime Contractor will be responsible for the distribution of their approved drawings/cuts in a timely manner to other Prime Contractors (and subcontractors) for coordination with their work. Any additional costs generated due to the lack of transfer information will be borne by the Prime Contractor responsible for distribution. In the event the Prime Contractor fails to distribute shop drawings/product information to other Prime Contractors (and their subcontractors), the Owner reserves the right to have the Architect make the necessary copies and Federal Express to the parties involved. All costs incurred by the Architect will be back-charged to the Prime Contractor responsible for not distributing the shop drawings/product information. The Prime Contractors are responsible for coordinating their own work with the work of other Prime Contractors and/or their subcontractors.
- D. Shop drawings/submittals returned to the Prime Contractors for second resubmission will require a two (2) day turnaround on resubmission. Submittals requiring a second resubmission will result in charges for additional Architect/Engineer review time. All returned shop drawings must be sent Federal Express Overnight Priority Delivery.

1.07 ARCHITECT/ENGINEER:

- A. Review for:
 - 1. Design concept of project.
 - 2. Compliance with contract documents.
- B. Review of separate items does not constitute review of an assembly in which item functions.
- C. Stamp and initial or sign to review of submission.
- D. Return submissions to Prime Contractor for distribution.
- E. Note: Based upon the amount of multiple submittals received in one day, and their content, *unless they are specifically numbered by the Prime Contractor for their order of relative importance* on his Letter of Transmittal, the Architect shall establish the level of importance of each submittal, and shall be allowed sufficient time (in the Architect's professional judgement) to permit adequate review. Such submissions will be reviewed either: a) in the time order in which they were received by the Architect's office, b) in their natural progressive order of construction placement, or c) in order of preference, as determined by the Architect. As a result of multiple/sequential submissions, no delays in time, or Prime Contractor hard or soft costs shall be implied or imposed onto the Architect. It is the Prime

Contractor's complete responsibility to adhere to the prepared Construction Schedule at all costs, including extended delays which may be incurred by time required for adequate review from the Architect's office.

- F. Architect's Stamp: The Architect's stamp (indicating initials and date), affixed to any shop drawing, manufacturer's specification cut or sample is only for design concept conformance, and general compliance with the content of the contract documents. This does not relieve the Prime Contractor of his/her responsibility to comply with the requirements of the Contract Documents.

1.08 TIME FOR SUBMISSION:

- A. The Prime Contractor unless otherwise directed by the Architect, shall submit to the latter for approval all shop drawings, product data, and samples as specified above.

Within 2 weeks of Notice to Proceed, the following submittals shall be sent:

<u>Section</u>	<u>Description</u>	<u>Item</u>
1A	Schedules & Reports	Plan of Operations & Progress Schedules
1C	Insurance Requirements	Certificates of Insurances
1D	Product Approval Standard	Notification Letter to EPA - Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates
01010	Work Under This Contract (Asbestos)	NYSLD & EPA-AHERA certificates, Log Book, Waste Manifests, Dump Receipts, Employee Protection Plan, OSHA Medical Monitoring, Respiratory Training and Protection Plan, copies of all inspection & permit certifications.
01015	Project Schedule	Contractor's Project Schedule, reflecting critical milestones & completion dates
01020	Allowances	N/A
01030	Special Procedures and Provisions	Written Guarantee of complete installation(s), As-Built drawings, equivalency requirements.
01050	Uniform Safety Standards for School Construction and Maintenance Projects - Commissioner's Regulations	N/A
01070	Abbreviations and Symbols	N/A
01085	Applicable Standards	N/A
01230	Construction Phase Clarifications	Weekly RFI Logs during construction
01300	Submissions	this Section
01500	Construction Facilities & Temporary Controls	Staging Plans, Temporary Partitions Layout
01550	Selective Demolition	Methods & Operations Sequence Schedule, Demolition & Removals sequencing
01610	Asbestos Abatement	Contractor Quality Assurance Items 1-4, Valid Asbestos Handling License, Proof of EPA-Accreditation for Response Actions (submitted w/ Bid) Notification Letter to EPA - Dump Receipt & Waste Manifest, NYS Labor Dept & EPA-AHERA Certificates, Log Book, Waste Manifests, Dump Receipts, Employee Protection Plan, OSHA Medical Monitoring, Respiratory Training and Protection Plan, copies of all inspection & permit certifications.
01611	Test Laboratory Services	Laboratory Approval & Qualifications per 1.05A; Analysis of Contaminated Fillers via NIOSH Method, using Phase Contrast Microscopy; Test Results
01612	Methods of Removal & Temporary Enclosures	Room Inspection Reports; Submission of Asbestos Caution Signs & Text, Written Emergency Procedures, Detail on Temporary Walls
01613	Asbestos Removal	N/A
01614	Air Monitoring	Air Monitoring Test Results; Daily Logs from Safety Monitor
01615	Project Decontamination	Air Maintain Test Results

01616	Clean-Up Procedures	N/A
01617	Monitoring & Supervision	Air Sampling & Analysis Data Results (per 1.04); Post Removal Test Results
01618	Removal of Asbestos Contaminated Substrate Material - Manual Scrape Method	Refer to 1.11 - Submittals of Section 02080
01700	Contract Closeout	Contractor's Notice of Substantial Completion, Contractor's Punchlist, Final Inspection Notice, O&M manuals, Contract Closeout Documents, As-Built, Guarantees
01710	Final Cleaning	N/A
01720	Project Record Documents	Project Record Documents at project completion
02000	Site Work Overview	Alternate / Additional Design Criteria
04100	Mortars	Technical Data (materials), Design Mix, pigment samples
04200	Unit Masonry	Technical Data, Fire Performance Data, Field Mock-ups, Unit Samples, Accessories Samples
04202	Glazed Masonry Units	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04206	Flagstone Restoration and Mortar Joint Tuckpointing	Technical Data, Certifications, Samples
04252	Masonry Thin Brick Veneer	Technical Data, Certifications, Samples, Mock-Ups
04270	Glass Unit Masonry	Technical Data, Certifications, test reports, full-size samples, Sample Mock-ups
04400	Belgian Block	Technical Data, Shop Drawings, Samples
04430	Simulated Masonry	Technical Data, Shop Drawings, Samples
04435	Cast Stone	Technical Data, Shop Drawings, Samples
04500	Masonry Restoration & Cleaning	Technical Data, Samples
04502	Masonry Surface Cleaning	Technical Data on application, equipment & materials
04720	Cast Stone	Technical Data, Shop Drawings, Samples, Applicable Experience

Within 4 weeks of Notice to Proceed, the following submittals shall be sent:

<u>Section</u>	<u>Description</u>	<u>Item</u>
02200	Earth Work	Sheetpiling, bracing and shoring details, certified by a NYS Professional Engineer. Shop Drawings, Details, Technical Data, Written Confirmation of all Easements
02270	Sediment and Erosion Control Procedures and Requirements	Temporary and Permanent Sediment and Erosion Control Schedule; Waste Material Disposal Plan
02350	Timber Piles	NYSPE-certified Pile Driving Log, NYSLS-certified As-Driven Pile Location Plan
02400	Storm Water Drainage, Structure and Castings	Technical Data, Materials Certification, Shop Drawings
02410 & 02411	Sand Slit Drainage Systems	5-Year Experience & References
02452	Grounds, Traffic & Parking Signs	Fabrication and Installation Drawings
02486	Synthetic Turf	Shop Drawings, Product Data, Sample Warranty, Credentials
02542	Playground Surfacing System (Wood Fiber)	Technical Data, Warranty
02543	Playground Surfacing System (Poured Rubber)	Technical Data, Warranty
02544	Playground Surfacing System (Rubber Tiles)	Technical Data, Warranty
02501	Reinforced Concrete Piping	SCDPW Class IV Certification
02504	Cleaning Existing Storm Water Drainage Systems	N/A
02506	Abandonment of Existing Sanitary and Storm Water Systems	Copies of Submittals to SC Dept. of Health Services
02519	Segmented Retaining Wall Units	Technical Data, Shop Drawings, Warranty
02531	Tennis Court Surfacing	Material Certificates, MSDS Data, Manufacturer Approval of Installer, Technical Data, Samples
02536	Track & Field Event Surfacing (Urethane)	Material Certificates, MSDS Data, Manufacturer Approval of Installer, Technical Data, Samples
02537	Cinder Running Track Reconstruction	Technical Data
02577	Pavement Marking	Technical Data, Compliance Letter from Manufac.
02578	Thermoplastic Pavement Markings	Technical Data, Letter of Compliance with SCDPW Item 685
02579	Pre-Formed Reflectorized Pavement Markings	Technical Data, Letter of Compliance with SCDPW Item 685
02600	Hot Mix Asphalt Pavement System	Technical Data, Plant Certification
02601	Asphalt Overlay	Technical Data, Plant Certification

02604	Pavement Crack Sealing	Technical Data
02602	Asphalt Repair	Technical Data
<u>Section</u>	<u>Description</u>	<u>Item</u>
02603	Asphalt Sealing	Technical Data
02660	Water & Sanitary Systems	Technical Data, Trade Designations
02702	Ballfield Renovation	Technical Data, Shop Drawings, Samples
02711	Subsurface Drainage System	Technical Data, Samples
02734	Irrigation Well Pump	Technical Data, Copies of permits & test results
02800	Site Amenities	Technical Data, Shop Drawings, Samples
02801	Topsoil, Lawns & Grasses	Technical Data, Seed Mixture
02810	Irrigation System	Technical Data, Installation Instructions
02820	Exterior Athletic Equipment & Backstops	Technical Data, Shop Drawings, Samples
02831	Galvanized Chain Link Fencing	Technical Data, Shop Drawings, Samples
02832	Vinyl Coated Chain Link Fencing	Technical Data, Shop Drawings, Samples
03300	Cast In Place Concrete	Technical Data, Shop Drawings, Design Mix, Test Reports, Material Certificates, Concrete Testing Lab
03310	Concrete Work	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Testing Lab
03311	Concrete Curb	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Concrete Testing Lab
03312	Concrete Sidewalk	Technical Data, Shop Drawings, Samples, Test Reports, Material Certificates, Concrete Testing Lab
03318	Driveway Aprons	Technical Data, Shop Drawings, Design Mix, Test Reports, Material Certificates, Testing Lab
03412	Precast Concrete Roof Plank	Technical Data
03450	Architectural Precast Concrete	Technical Data, Shop Drawings, Samples
03500	Tectum Roof Deck	Technical Data, Samples
03511	Self-Leveling Concrete Floor Underlayment	Technical Data
03512	Self-Leveling Concrete Floor Underlayment (over Extruded Polystyrene Foam)	Technical Data
03650	Underlayment Concrete	Technical Data, Manufacturers Certifications
03710	Concrete Cleaning	Cleaning Procedure, Dust, Dirt & Debris Containment Plan
03720-1	Concrete Resurfacing (Rebar Primer)	Manufacturer's Guarantees, Technical Data, Samples

03720-2	Concrete Resurfacing (Repair Mortar)	Manufacturer's Guarantees, Technical Data, Samples
03720-3	Concrete Resurfacing (Finish Coating)	Manufacturer's Guarantees, Technical Data, Samples
03720-4	Concrete Resurfacing (Repair Mortar)	Manufacturer's Guarantees, Technical Data, Samples

<u>Section</u>	<u>Description</u>	<u>Item</u>
05030	Metal Finishes	Technical Data, Material Certifications
05120	Structural Steel	Technical Data, Shop Drawings, Test Reports, Surveys, templates
05210	Steel Joists and Girders	Technical Data, Shop Drawings, Welders Certificates
05300	Metal Decking	Technical Data, Shop Drawings, Insurance Certification, templates
05400	Cold Formed Metal Framing	Technical Data, Shop Drawings, templates
05500	Metal Fabrication	Technical Data, Shop Drawings, templates
05510	Miscellaneous Metal	Technical Data, Shop Drawings, Samples
05512	Wrought Iron Malleable Railings	Technical Data, Shop Drawings, Samples
05514	Metal Railings	Technical Data, Shop Drawings, Samples
05515	Ornamental Metal Work (Aluminum)	Technical Data, Shop Drawings
05530	Prefabricated Expansion Joint Covers	Technical Data, Shop Drawings
05580	Arch Metal Column Covers	Technical Data, Shop Drawings
05800	Expansion Joint Covers	Technical Data, Shop Drawings
06100	Rough Carpentry	Material Certificates, Treatment Data
06170	Prefabricated Structural Wood	NYSPE-prepared Design Calculations, Shop Drawings, Technical Data
06200	Finish Carpentry	Technical Data, Shop Drawings
06204	Wood Veneer Cabinetry	Technical Data, Shop Drawings, Samples
06208	Wood Raised Panel	Technical Data, Shop Drawings
06600	Fiber-Reinforced Polymer	Technical Data, Shop Drawings, Samples
07012	Work Included (Urethane Roofing)	Technical Data, Applicator's Licenses & Proof of Applicable Experience, warranties
07013	Codes, Standards and Permits (Urethane Roofing)	Required Operations and Permits, Tests and Inspections
07140	Metal Oxide Waterproofing	Technical Data, Shop Drawings
07160	Bituminous Dampproofing	Technical Data, Shop Drawings
07161	Subsurface Drainage System	Technical Data, Shop Drawings, Samples
07180	Water Repellents	Technical Data, Shop Drawings, Samples
07190	Underslab Vapor Barrier	Technical Data

07191	Polyethylene Vapor Barrier (Relocatable Classrooms)	Technical Data
07200	Building Insulation	Technical Data, Certified Test Reports
07210	Fireproofing Insulation	Technical Data, Certified Test Reports
07219	Preformed Masonry Insulation	Technical Data, Full Sized Samples
07240	Exterior Insulation and Finish Systems	Technical Data, Shop Drawings, Certificate of Applicator Approval, Samples (Color & Texture)

<u>Section</u>	<u>Description</u>	<u>Item</u>
07241	Direct Applied Exterior Finish Systems	Technical Data, Shop Drawings, Certificate of Applicator Approval, Samples (Color & Texture)
07255	Cementitious Fireproofing	Technical Data, Testing Data, Thickness Schedule
07310	Asphalt Shingles (New Installation-Grand Manor)	Technical Data, Samples, Warranty
07312	Asphalt Shingles	Technical Data, Samples, Warranty
07315	Asphalt Shingles (over existing)	Technical Data, Samples, Warranty
07323	Shingle and Roofing Tiles	Technical Data, Samples, Warranty
07324	Slate Roofing Shingles	Technical Data, Samples, Warranty
07325	Slate Shingles	Technical Data, Samples, Warranty
07326	Slate Shingle Replacement	Technical Data, Samples, Warranty
07410	Concealed Fastener Metal Wall and Soffit Panels	Technical Data, Shop Drawings
07415	Adjust-a-Web Framing System	Technical Data, Shop Drawings, NYSPE-Certified Structural Calculations
07420	Cement Board Wall and Soffit Panels	Technical Data, Shop Drawings
07460	Vinyl Siding	Technical Data, Samples
07520	2001 Kelly Roofing Membrane	Technical Data, Shop Drawings, UL & FM Compliance Data, Tapered Insulation Drawings, Installer's Certifications
07531	Elastic Sheet Roofing (wood deck)	Technical Data, Shop Drawings, Tapered Insulation Drawings, Labor & Material Guarantee
07532	Elastic Sheet Roofing (Vented) (Non-combustible Deck)	Technical Data, Shop Drawings, Tapered Insulation Drawings, Labor & Material Guarantee
07534	SBS Modified Bitumen Roofing (Mop - Torch)	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07535	SBS Modified Bitumen Roofing (Mop - Mop)	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07536	Heat-Welded Modified Bitumen Roofing	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications

07537	4-Ply Built-Up Roofing/ Modified Bitumen System	Technical Data, Shop Drawings, Tapered Insulation Drawings, UL/FM Compliance Data, Certifications
07540	Urethane / Silicone Elastomeric Roofing	Technical Data, Shop Drawings, Samples
07541	Urethane / Silicone Elastomeric Roofing Recoat	Technical Data, Shop Drawings, Samples
07545	Metal Roofing System	Technical Data, Shop Drawings, Samples
07550	Fully Adhered Roofing System	Technical Data, Shop Drawings, Samples
07600	Flashing & Sheet Metal	Technical Data, Shop Drawings, Samples
07601	Flashing and Sheet Metal (Met Fab Manuf.)	Technical Data, Shop Drawings, Samples
<u>07602</u> <u>Section</u>	<u>Flashing</u> <u>Description</u>	<u>Technical Data, Shop Drawings, Samples</u> <u>Item</u>
07604	Lead Coated Copper Flashing and Sheet Metal	Technical Data, Shop Drawings, Samples
07605	Terne Coated Stainless Steel Flashing and Sheet Metal	Technical Data, Shop Drawings, Samples
07606	Copper Louvers	Technical Data, Shop Drawings, Samples
07632	PVC Roof Drain and Drain Pipe Removal	Technical Data, Shop Drawings
07634	Lead Coated Copper Gutters and Downspouts	Technical Data, Shop Drawings, Samples
07635	Aluminum Gutters & Downspouts	Technical Data, Shop Drawings, Samples
07710	Retrofit Insert Drains	Technical Data, Shop Drawings, Samples
07715	Prefabricated Metal Fascia & Soffit Panels	Technical Data, Shop Drawings, Samples
07800	Roof Accessories	Technical Data, Shop Drawings, Samples
07830	Roof Scuttle	Technical Data, Shop Drawings, Finish Samples
07900	Caulking	Technical Data, Certifications, Test Reports
07910	Joint Sealers	Technical Data, Certifications, Test Reports
07920	Preformed Joint Sealers	Technical Data, Samples
08110	Steel Doors and Frames	Technical Data, Shop Drawings, Samples, Certifications
08120	Aluminum Doors and Frames	Technical Data, Shop Drawings, Finish Samples, Associated Hardware Schedule
08121	FRP Doors and Framing	Technical Data, Shop Drawings, Finish Samples, Associated Hardware Schedule
08211	Flush Wood Doors	Technical Data, Shop Drawings, Finish Samples
08261	Wood French Door Assembly	Technical Data, Samples, Certificates, Finish Samples
08306	Fire Rated Access Doors	Technical Data, Shop Drawings, Finish Samples
08330	Roll Up Coiling Fire Doors	Technical Data, Shop Drawings, Finish Samples

08331	Roll-up Overhead Doors	Technical Data, Shop Drawings, Finish Samples
08360	Upward Acting Sectional Doors	Technical Data, Shop Drawings, Finish Samples
08410	Aluminum Entrances and Storefronts	Technical Data, Shop Drawings, Finish Samples Manufacturers Certification, QC/Performance Results
08520	Aluminum Windows (Dual Glazed - EFCO)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08522	Aluminum Windows (Dual Glazed - Litex)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08523	Window Repair	Technical Data, Shop Drawings
08524	Aluminum Windows (Dual Glazed - Graham)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08526	Aluminum Windows (Dual Prime Horizontal Slider - Litex)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results

<u>Section</u>	<u>Description</u>	<u>Item</u>
08528	Aluminum Windows (Dual Double Hung)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08630	Vinyl Sheath Double Hung Wood Windows (Andersen)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08631	Aluminum Clad Wood Windows (Marvin)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08632	New Aluminum Clad Wood Windows (Marvin)	Technical Data, Shop Drawings, Samples, Manufacturers Certification, QC/Performance Results
08640	Self-Flashing Polycarbonate Unit Skylights	Technical Data, Shop Drawings, Samples
08710	Finish Hardware	Technical Data, Hardware Schedule, Final Hardware Schedule Content, Keying Schedule, Samples, Templates
08711	Aluminum Storm Doors	Technical Data, Shop Drawings
08712	Aluminum Insect Screens	Technical Data, Shop Drawings
08722	Door Operator	Technical Data, Shop Drawings, Samples
08760	Window Hardware and Specialties	Technical Data, Shop Drawings
08800	Glass and Glazing	Technical Data, Shop Drawings, Samples
08806	Fire Rated Glazing (FireLite)	Technical Data, Shop Drawings, Samples
08807	Oversized Fire Rated Glazed Assemblies (VL3000)	Technical Data, Shop Drawings, Samples
08808	Fire Rated Wire Glazing	Technical Data, Shop Drawings, Samples
08920	Glazed Aluminum Curtain Walls (EFCO)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals
08922	Glazed Aluminum Curtain Wall System (US Aluminum Corp. Series 3200)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals

08924	Glazed Aluminum Curtain Walls (Litex)	Technical Data, Shop Drawings, QC/Performance Results, Closeout Submittals
08930	Metal Glazing Panels (1/4" Porcelain Enamel Panels)	Technical Data, Shop Drawings, Samples
08950	Insulated Translucent Panel System	Manufacturer's & Erectors Qualifications, Shop Drawings, Color Samples, Test Reports per 1.03B, Quality Control per 1.03, Energy Calculations per 1.03
08951	Insulated Translucent Panel Skylight System	Technical Data, Shop Drawings, Color Samples, Test Reports per 1.03B, Quality Control per 1.03, Energy Calculations per 1.03
09102	Plaster (over CMU-Interior)	Technical Data, Sample Panels
09210	Stucco Plaster (on CMU at Exterior)	Technical Data, Sample Panels
09220	Surewall Fiber Reinforced Plaster System (FRP)	Technical Data, Sample Panels
09221	Lath and Cement Plaster (Stucco)	Technical Data, Sample Panels
09250	Gypsum Wallboard	Technical Data, Samples

<u>Section</u>	<u>Description</u>	<u>Item</u>
09255	Vinyl Coated Gypsum Wallboard Panels	Technical Data with Specified Compliances, Samples, Shop Drawings, Engineering Calculations
09290	Gypsum Fabrication	Technical Data, Samples
09300	Ceramic Tile	Technical Data, Samples
09400	Terrazzo Flooring	Technical Data, Samples
09410	Thin-Set Epoxy Terrazzo Flooring	Technical Data, Samples, System Data, Installer's Experience
09425	Terrazzo Tile	Technical Data, Samples
09500	Acoustical Wall Panels	Technical Data, Samples
09510	Acoustic Ceiling System	Technical Data, Samples
09511	Sprayed Acoustical Applications	Technical Data, Samples, Test Reports, Applicator Certifications
09512	Acoustical Ceiling Tile / Grid Restoration	Technical Data, Samples
09513	Metal Ceiling Systems	Technical Data, Samples, Maintenance Instructions
09514	Fiberglass Ceiling Grid System	Technical Data, Samples, Maintenance Instructions
09515	Acoustical Tile Coating	Technical Data, Samples, Maintenance Instructions
09550	Wood Flooring	Technical Data, Samples
09563	Wood Athletic Flooring (Conner "Duracushion III")	Technical Data, Samples
09565	Wood Athletic Flooring (Robbins "Locktite")	Technical Data, Samples
09567	Wood Athletic Flooring (Conner "Perma-Lock")	Technical Data, Samples

09569	Wood Athletic Flooring (Conner "Neo-Shok")	Technical Data, Samples
09570	Wood Flooring (Refinishing)	Technical Data
09650	Resilient Flooring	Technical Data, Samples
09651	Rubber Stair Treads	Technical Data, Samples
09666	Ribbed Rubber Matting	Technical Data, Shop Drawings, Samples
09680	Carpeting	Technical Data, Shop Drawings, Samples
09770	Indoor Athletic Surfacing	Technical Data, Samples
09772	Vinyl (Fiberglass Reinforced) Indoor Athletic Surfacing	Technical Data, Shop Drawings, Samples
09774	Poured Urethane Indoor Athletic Floor Surfacing	Manufacturer/Installers Certification - 10 years Experience, Shop Drawings for Game Lines & Track Markings, Technical Data, Samples, Maintenance Instruction, Product Warranty
09800	Special Coatings	Technical Data, Test Data, Samples
09810	Epoxy/Quartz Flooring	Technical Data, Shop Drawings, Sample Panels, Test Results
09815	Elastomeric Quartz Flooring (EnviroChem)	Technical Data, Shop Drawings, Sample Panels, Test Results

<u>Section</u>	<u>Description</u>	<u>Item</u>
09820	Marble Dusting	Technical Data, Shop Drawings, Samples, Water Analysis and Calculations
09831	Silicone Elastomeric Coating	Technical Data, Applicator Certifications
09845	Intumescent Coating	Technical Data, Samples, Sample Panels
09900	Painting	Technical Data, Samples, Field Samples
09902	Polomyx Waterbase Paint	Technical Data, Samples, Field Samples
09950	Wall Coverings	Technical Data, Samples, Certificate of Compliance
09986	Fiberglass Reinforced Plastic Panels	Technical Data, Shop Drawings, Samples
10100	Visual Display Products	Technical Data, Certified Lab Test Reports, Samples
10102	Dry Markerboards	Technical Data, Shop Drawings, Samples
10240	Skylight Safety Screens	Technical Data, Shop Drawings, Samples
10440	Specialty Signs (Roof I.D. Sign)	Technical Data, Full-Sized Samples
10441	Signage	Technical Data, Shop Drawings, Samples
10500	Lockers	Technical Data, Shop Drawings, Finish Samples
10520	Fire Extinguishers and Cabinets	Technical Data, Shop Drawings, Finish Samples
10600	Toilet Partitions (Steel)	Technical Data, Shop Drawings, Finish Samples
10601	Toilet Partitions (Polymer)	Technical Data, Shop Drawings, Finish Samples

10650	Operable Partitions	Technical Data, Shop Drawings, Finish Samples
10651	Electrically-Operated Continuously Hinged Operable Partitions	Technical Data, Shop Drawings, Finish Samples
10800	Toilet Accessories	Technical Data, Shop Drawings, Finish Samples
11060	Stage Equipment	Technical Data, Shop Drawings, Finish Samples, O&M Manuals, Affidavits, Guarantees
11061	Stage Rigging and Drapery	Technical Data, Shop Drawings, Rigging Schedule, Finish Samples, Affidavits, Guarantees
11063	Fire Safety Curtain and Rigging	Technical Data, Shop Drawings, Rigging Schedule, Finish Samples, Affidavits, Guarantees
11400	Food Service Equipment	Technical Data, Shop Drawings
11480	Athletic Equipment	Technical Data, Samples
11482	Resilient Protective Padding	Technical Data, Shop Drawings, Samples, Guarantees
11484	Resilient Safety Tile System	Technical Data, Shop Drawings, Samples, Guarantees
11600	Laboratory Casework and Equipment	Technical Data, Shop Drawings, Test Reports, Certifications, Warrantees
11601	Laboratory Casework and Equipment (Collegedale Casework, Inc.)	Technical Data, Shop Drawings, Test Reports, Certifications, Warrantees
11602	Laboratory Casework and Equipment (Sheldon)	Technical Data, Shop Drawings, O&M Manuals Color and Finish Samples, Warranties

<u>Section</u>	<u>Description</u>	<u>Item</u>
11603	Laboratory Casework and Equipment (Fisher Hamilton Wood Casework)	Technical Data, Shop Drawings, O&M Manuals, Color and Finish Samples, Warrantees
11605	Laboratory Casework and Equipment (Modern School Supplies)	Technical Data, Shop Drawings, Color and Finish Samples, O&M Manuals, Warrantees
11700	Playground Equipment (Playground Environments)	Safety Specifications, Shop Drawings, Warranty
11701	Playground Equipment (Playworld)	Safety Specifications, Shop Drawings, Warranty
11702	Playground Equipment (Park Systems)	Safety Specifications, Shop Drawings, Warranty
12342	Panel Systems	Technical Data, Shop Drawings, Warranty
12345	Laboratory Casework	Technical Data, Shop Drawings, Color and Finish Samples, O&M Manuals, Guarantee
12346	Laminate-Clad Casework (Trimline Series)	Technical Data, Shop Drawings, Color and Finish Samples
12347	Laminate-Clad Computer Casework	Technical Data, Shop Drawings, Color and Finish Samples
12348	Laminate-Clad Casework	Technical Data, Shop Drawings, Samples

12350	Wood Casework and Classroom Wardrobe Units	Technical Data, Shop Drawings, Samples
12492	Spring-Operated Roller Shades	Technical Data, Shop Drawings, Samples
12505	Curtains / Draperies	Technical Data, Shop Drawings, Samples, O&M Manuals, Flame Resistance Affidavits, Guarantee
12510	Horizontal Window Blinds	Technical Data, Shop Drawings, Samples
12520	Vertical Window Blinds	Technical Data, Shop Drawings, Samples
12530	Roller Shades	Technical Data, Shop Drawings, Samples
12642	Classroom Wardrobe Units	Technical Data, Shop Drawings, Samples
12690	Recessed Entrance Mats	Technical Data, Shop Drawings
12710	Auditorium, Arena and Theater Seating	Technical Data, Shop Drawings, Samples
12715	Seating Refurbishment/ Reupholstery	Technical Data, Shop Drawings, Samples
12760	Telescoping Bleachers	Technical Data, Shop Drawings, Samples, Closeout Submittals
12761	Telescoping Gym Seats (Electrically Operated)	Technical Data, Shop Drawings, Project List, Samples, O&M Manuals, Manufacturer Qualifications, Installer Qualifications, Warranty
13050	Access Flooring	Technical Data, Shop Drawings, Installer Qualifications
13122	Metal Building Systems	Technical Data, NYSPE-certified Shop Drawings, Certified Design Analysis, Letter of Certification
13125	Permanent Grandstands	Technical Data, Shop Drawings, Certificates, Product Samples, Color Samples

<u>Section</u>	<u>Description</u>	<u>Item</u>
13650	Prefabricated Structures	Technical Data, Foundation & Pier Location Plans, Complete Set of NYSPE-certified Shop Drawings of Prefab Building
13750	Pre-manufactured Chimneys	Technical Data, Shop Drawings
14200	Elevator (Dover)	Technical Data, Shop Drawings
14220	Vertical Wheelchair Lift	Technical Data, Shop Drawings
14240	Elevator (Otis)	Technical Data, Shop Drawings
15010	General	N/A
15011	Special Conditions	Shop Drawings, List of Equivalents
15012	Work Included	Shop Drawings, As-Builts
15014	Codes, Standards and Permits	N/A
15015	Maintenance Instructions	Maintenance Schedule(s)
15016	Test and Instructions	Written Report to Architect
15017	Vibration and Noise Control	N/A

15018	Motors and Electrical Work	Technical Data
15019	Guarantee	N/A
15020	Cutting and Patching	N/A
15050	Piping and Accessories	Technical Data
15051	Basic Materials and Methods	Technical Data
15052	Pipe Fittings	Technical Data
15053	Joints	Technical Data
15055	Valves	Technical Data
15057	Valve Tags, Nameplates and Identification	Technical Data
15058	Pipe Hangers, Bases and Supports	Technical Data
15139	Steam to Water Heat Exchangers	Technical Data
15141	Centrifugal Pumps	Technical Data
15175	Preliminary Work	N/A
15180	Insulation	Technical Data
15181	Insulation (Second Spec)	Technical Data
15300	Fire Sprinkler System	Technical Data, Shop Drawings
15550	Burners & Controls	Technical Data, Installation certification
15551	Fuel Oil Sump Pump Unit	Technical Data, Shop Drawings
15600	Fuel Oil Storage Tank, Work Included	Technical Data, copies of Permits & Inspections, As-Built Drawings
15601	Hot Water Boilers	Technical Data
15602	Pressure Atomizing Burners	Technical Data

<u>Section</u>	<u>Description</u>	<u>Item</u>
15603	Rooftop HVAC Unit Rehabilitation	Technical Data
15604	Boiler Reconstruction	Technical Data
15605	Cast Iron Boilers	Technical Data
15607	New Duplex Sump Pump Unit	Technical Data
15608	Water Heater	Technical Data
15610	Fiberglass Fuel Oil Storage Tank	Technical Data
15611	Above Ground Diesel Fuel Storage Tank	Technical Data
15612	New Fuel Oil Pump Set/ Burner Modification	Technical Data

15650	Heating, Ventilating & Air Conditioning	Technical Data, Installation Drawings
15651	Thru-wall Heat Pumps	Technical Data
15652	Electric Cabinet Heater	Technical Data
15653	New Cooling Tower and Related Equipment	Technical Data
15656	Temperature Control Systems	Technical Data
15657	Electrical Work	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15658	Hot Water Boiler (Steel)	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15659	Vacuum and Boiler Feed Unit	Technical Data, Bill of Materials, Installation Drawings, Wiring Diagrams
15675	Commercial Air-Cooled Condensing Units	Technical Data, Installation Drawings
15700	Heat Transfer	Technical Data, Installation Drawings
15701	Hot Water Convector Units	Technical Data, Installation Drawings
15702	Classroom Unit Ventilators	Technical Data, Installation Drawings
15703	Make-up Air Unit and Exhaust Fan	Technical Data, Installation Drawings
15705	Rooftop Unit (RTU-3)	Technical Data, Installation Drawings
15706	Rooftop Unit (RTU-2)	Technical Data, Installation Drawings
15710	Hot Water Coils	Technical Data, Installation Drawings
15761	Fan Coil Units	Technical Data, Installation Drawings
15800	Air Distribution	Technical Data, Installation Drawings
15802	Inspection, Testing & Balancing	Final Reports to the Architect
15803	Gravity Louvers/Penthouses	Technical Data, Shop Drawings
15804	Exhaust Fans	Technical Data, Installation Drawings
15805	Ductwork	Technical Data, Shop Drawings
<u>Section</u>	<u>Description</u>	<u>Item</u>
15806	Fire Dampers	Technical Data, Shop Drawings
15807	New Dust Collection Unit	
15808	Registers, Grilles & Diffusers	Technical Data, Shop Drawings
15810	Retractable Kiln Exhaust Hood	Technical Data, Shop Drawings
15860	Light Duty Air Handling Units	Technical Data, Shop Drawings
15861	Light Duty Air Handling Units (Second Spec)	Technical Data, Shop Drawings
15903	Automatic Temperature	Technical Data, Shop Drawings

	Controls	
15904	Electronic Automatic Temperature Control	Technical Data, Shop Drawings
15011A	Special Conditions	Technical Data, Shop Drawings
15012A	Work Included	Technical Data, Shop Drawings
15013A	Codes, Standards and Permits	N/A
15014A	Schedule of Frequency	N/A
15015A	Maintenance Instructions	Technical Manuals, Maintenance Schedules, Parts List, List of Local Suppliers
15016A	Test & Instructions	Written Report to the Architect
15019A	Guarantee	Printed Guarantees
15050A	Basic Materials and Methods	Technical Data
15052A	Electric Wiring for Plumbing Work	Wiring Diagrams, Shop Drawings
15053A	Joints	Technical Data
15054A	Pipe Specialties	Technical Data
15055A	Valves	Technical Data
15057A	Valve Tags, Nameplates, & Identification	Technical Data
15058A	Pipe Hangers, Bases & Supports	Technical Data
15060A	Cutting and Patching	N/A
15180A	Piping Insulation	Technical Data
15302A	Sewer Installation	Technical Data
15400A	Plumbing System	Technical Data, Installation Drawings
15403A	Drainage & Vent Systems	Technical Data, Installation Drawings
15404A	Domestic Water System	Technical Data, Installation Drawings, Test Results
15409A	Plumbing Fixtures	Technical Data, Roughing Drawings
15410A	RPZ Device in Hot Box	Technical Data, Installation Drawings
15410A	New Duplex Sump Pump Unit	Technical Data
15411A	Water Heater	Technical Data, Installation Drawings
<u>Section</u>	<u>Description</u>	<u>Item</u>
15420A	Domestic Hot Water Heaters	Technical Data, Installation Drawings
15430A	Exhaust Fan	Technical Data, Installation Drawings
16010	Electrical Work	Technical Data, Shop Drawings
16013	Work Included	N/A
16100	Basic Materials & Methods	Technical Data, Shop Drawings

16140	Wiring Devices	Technical Data
16200	Power Generation	Technical Data
16202	Emergency Generator	Technical Data, Connection Diagrams
16203	Automatic Transfer Switch	Technical Data, Test Data
16429	120/208 and 120/240 Voltage Distribution	Technical Data, Shop Drawings (see 16429), Closeout Submittals
16462	Dry-Type Distribution Transformers K-Rated	Technical Data, Shop Drawings (see 16462), Closeout Submittals
16470	Panelboards	Technical Data, Shop Drawings (see 16470)
16475	Circuit Breakers	Technical Data, Installation Drawings
16500	Lighting	Technical Data, Installation Drawings
16502	Auditorium Lighting Control System	Technical Data, Installation Drawings
16510	Theatrical Lighting	Technical Data, Installation Drawings
16530	Site Lighting	Technical Data, Installation Drawings
16601	Lightning Protection	Technical Data, Installation Drawings
16671	Transient Voltage Surge Protection (TVSS)	Technical Data, Installation Drawings
16700	Telecommunications System	Technical Data, Shop Drawings, Reports
16704	Security System	Technical Data, Shop Drawings, Reports
16705	Fire Alarm and Smoke Detection System	Technical Data, Shop Drawings, Calculations
16706	Modified Public Address System	Technical Data, Shop Drawings
16707	Public Address Sound System	Technical Data, Shop Drawings, Warranties
16708	Auditorium Sound System	Technical Data, Shop Drawings, O&M Manuals
16720	Fire Alarm System	Technical Data, Installation Drawings
16730	Master Time-Program Clock System	Technical Data, Installation Drawings
16755	Electrical Security System	Technical Data, Shop Drawings, Qualifications
16760	Communications Systems	Technical Data, Shop Drawings, Samples
16810	Computer Network	Technical Data, Shop Drawings
17010	Technology Implementation	Technical Data, Installation Drawings

PART TWO - PRODUCTS

NOT APPLICABLE

PART THREE - EXECUTION

NOT APPLICABLE

END OF SECTION

Submittal Cover Sheet

Name of Contractor: _____

Project Name: _____

District Name: _____

Date: _____ Architect's Project No.: _____

Items Submitted: _____

Manufacturer: _____

Model No's: _____

Submission Number: _____ Spec Section: _____

Acknowledgement by Contractor: This submittal has been reviewed by the above named contractor in accordance with the contract documents describing and defining the requirements of such review

Signature: _____ Title of reviewer (print) _____

Name (print): _____ Date of review: _____

Notes:

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01450 - TESTING LABORATORY SERVICE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. The Owner will pay for services of the independent testing laboratory. Source of services as well as payment and rates of payments will be as directed by the Owner's Representative. Testing specified in the Project Manual shall be performed at a minimum. Construction Manager or Architect may request additional testing which will be compensated as agreed upon between the parties.
- B. Inspections and testing required by laws, ordinances, rules, regulations, or order of public authorities and General Conditions.
- C. Certification of products and mill test reports: Respective Specification Sections.
- D. Test, adjust, and balance of equipment.
- E. Inspection, sampling, and testing: Soils, asphalt, concrete, steel, masonry, mortar, and grout, etc. and specified elsewhere.
- F. Inspections, test, and related actions specified in this section and elsewhere in Contract Documents are not intended to limit contractor's quality control procedures, which facilitate compliance with requirements of Contract Documents.
- G. Related work specified elsewhere
 - 1. Refer to Section 01451 - Tests, Inspections, and special inspections.

1.03 QUALIFICATIONS OF LABORATORY AND SUBMITTALS

- A. Meet requirements of ASTM E329, current edition "Standards of Recommended Practice for inspection and testing Agencies for Concrete, Steel, and Bituminous Materials as used in Construction".
 - 1. The term "agency" as used in Section 4 of ASTM E329 shall mean the local or closest office of said agency.
- B. Laboratory qualifications for inspection, sampling, and testing of soils and aggregates shall be comparable to the requirements of ASTM E329.
- C. Testing Equipment

1. Calibrated at maximum 12-month intervals by devices of accuracy. Traceable to either:
 - a. National Bureau of Standards
 - b. Accepted Values of Natural Physical Constants.
 - c. Submit copy of Certificate of Calibration, made by accredited calibration agency.
- D. Submit documentation of specified requirements. Submit 2 copies to the Owner's Representative.
- E. All testing and inspection performed by the testing laboratory shall be under the direct supervision of a Professional Engineer licensed in the state of the construction activities. This Professional Engineer shall submit a letter certifying that all testing services are in conformance with the standards and specifications as specified in these Contract Documents. The letter shall also certify that all tested and inspected items and procedures conform to the Contract Documents, except where specifically noted on the inspection reports.
- F. All inspectors shall have at least one (1) year of experience performing the type of inspections to be performed on this project. Qualifications and experience of proposed inspectors shall be submitted to the architect for approval prior to the beginning of any testing.

1.04 QUALIFICATION OF SPECIAL INSPECTOR

- A. The special inspector must have the expertise necessary to ensure compliance with the approved Construction Documents and referenced standards.
- B. The special inspector, if an individual, should be a registered Structural Engineer or Professional Engineer specializing in structural engineering. If the special inspector is a agency, the agency should be under the responsible direction of a registered Structural Engineer or Professional Engineer specializing in Structural Engineering.
- C. Special inspector qualifications (New York State Department of State, Technical Bulletin January 2003).
 1. Reinforced Concrete: New York State Licensed Professional Engineer (PE) with relevant experience.
 2. Prestressed Concrete: Pre-tension tendons and post-tension tendons: PE with relevant experience.
 3. Welding: Current AWS Certified Welding Inspector.
 4. High Strength Bolting and Steel Frame Inspection: PE with relevant experience.
 5. Masonry: Current ICC Structural Masonry Certification and one

(1) year relevant experience.

6. Sprayed Fire Resistant Materials: PE with relevant experience.

7. Excavation and Filling; Verification of Soils and Bearing, Piling and Drilled Piers, Modular Retaining Walls and Related Geotech: PE with relevant experience.

8. Inspection of Fabricators: Bar joist, metal building and structural steel - see welding requirements.

9. Exterior and Interior Architectural Wall Panels: PE with relevant experience.

10. Exterior Insulation and Finish Systems: New York State Registered or Licensed Design Professional.

11. Smoke Control: Expertise in fire-protection engineering, mechanical engineering, and certification as air balancers.

12. Seismic Resistance: Refer to the applicable categories of this list.

NOTE: The list includes the word 'relevant' to describe experience for persons not holding formal certifications.

1.05 LABORATORY RESPONSIBILITIES, LIMITATIONS OF AUTHORITY

A. Provide qualified personnel promptly on notice.

B. Perform special inspections, sampling, and testing of materials and methods of construction.

1. Comply with specified standards; ASTM, other recognized authorities and as specified.

2. Ascertain compliance with requirements of Contract Documents.

C. Promptly notify Architect, Construction Manager, and Contractor of irregularities in the work to be performed in accordance with the Construction Documents and deficiencies of work performed which are observed during performance of services.

D. Promptly submit two (2) copies to the Construction Manager (one (1) to be turned over to Owner), two (2) copies directly to the Architect/Engineer and one (1) to the Contractor of reports of inspections and test, including the following information, as applicable:

1. Date issued.

2. Project title and number.

3. Testing laboratory name and address.

4. Name and signature of field inspector.
5. Date of inspection or sampling.
6. Record of temperature and weather.
7. Name and signature of laboratory inspector.
8. Identification of product and specification section.
9. Location in project.
10. Designation of the work and test method.
11. Observations regarding compliance with Contract Documents.
12. Complete inspection or test data.
13. Test results and interpretation of test results.
14. Recommendation on retesting.

E. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of contract documents.
2. Approve or accept portion of work.
3. Perform duties of the Contractor.

1.06 INSPECTOR RESPONSIBILITIES

- A. Notify the contractor of their presence and responsibilities at the job site.
- B. Observe assigned work. The inspector shall inspect all work for which they are responsible for conformance with the plans and specifications. Perform inspection in a timely manner to avoid delay of work.
- C. Report non-conforming items. Inspector shall bring all nonconforming items to the immediate attention of the contractor for correction. If any such item is not resolved in a timely manner or is about to be incorporated into the work, the Construction Manager and the Architect shall be notified immediately and the item noted in the inspector's written report. The inspector shall write a separate report to be posted at the job site regarding noted discrepancies that should contain, as a minimum, the following information about each nonconforming item:
 1. Description and exact location.
 2. Reference to applicable plan sheets, details and specifications.
 3. Resolution of corrective action taken and the date.

- D. Provide timely reports. The Inspector shall complete written inspection reports for each visit to the site. These reports shall be organized on a daily format and will be submitted to the Construction Manager, Architect, and Contractor at the approved times and frequency. In the reports the inspector should:
1. Describe inspections and tests made, with applicable locations.
 2. Indicate how nonconforming items are to be or were resolved.
 3. List unresolved items, parties notified, time and method of notification.
 4. Itemize changes authorized by the Architect.
- E. Submit final report. Inspector shall submit a final, signed report to the Construction Manager and Architect stating that all items requiring inspection and testing were fulfilled and reported, and to the best of their knowledge, in conformance with the approved plans and specifications. Items not in conformance, unresolved items, or any discrepancies in inspection coverage (i.e., missed inspections, periodic inspection when continuous inspection was required, etc.) should be specifically itemized in this report.

1.07 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall coordinate with independent testing agency performing inspections, tests, and quality control services.
1. Construction Manager will schedule services of independent testing to agency to perform services so specified.
- B. Retest Responsibility: Where results of required inspection, test, or similar service are unsatisfactory (do not indicate compliance of related work with requirements of Contract Documents), retests are the responsibility of the Contractor. Retesting of work revised or replaced by the Contractor is the Contractor's responsibility, where required tests are performed on original work. Retesting shall be performed by testing laboratory as directed by Construction Manager.
- C. Responsibility of Associated Services: Contractor is required to cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at project site.
- D. Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of work and without the need for removal/replacement of work to accommodate inspections and tests. Notify Construction Manager as required for all scheduling of times for inspections, test, taking of samples, and similar activities are contractor's responsibility.

PART 2 - MATERIALS

NOT APPLICABLE

PART 3 - EXECUTION

NOT APPLICABLE

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01451 - TESTS, INSPECTIONS & SPECIAL INSPECTIONS
QUALITY ASSURANCE PLAN

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SCOPE / SUMMARY:

- A. **Scope:** This project will require both general inspections and special inspections coordinated with all required testing and certifications throughout the Project Manual and/or the Building Code of the State of New York, as listed below. The Project Manual shall be carefully reviewed by the Prime Contractors for actual and detailed descriptions concerning responsibilities with regard to testing parameters. All testing which is assigned to a Prime Contractor shall be borne as a part of their submitted Base Bid for this project, and shall not be subject to additional costs to the Owner. There are specific general inspections, as well as coordination of inspections, which are to be included in each Prime Contractor's Base Bid submitted; refer to each specification section for complete information. ***Note: The cost of all General and Special Inspections performed by the independent testing laboratory/laboratories retained by the Owner shall be directly borne by the Owner, implemented by and coordinated through the Owner's Representative and/or the Construction Manager.***

B. **Summary:**

1. This Section includes responsibilities relating to quality control services and extent of quality control services to be performed.
2. Related Work Specified Elsewhere
 - a. Section 01450 - Testing Laboratory Services.
3. Definitions: Quality control services include inspections and tests, special inspections and actions related thereto including reports, but do not include contract enforcement activities performed directly by Architect/Engineer. Quality control services include those inspections and tests, special inspections and related actions performed by independent agencies and governing agencies as well as directly by Contractor.
 - a. Testing service is required to immediately notify the Architect and the Construction Manager of discrepancies observed in the Work performed and to be performed to the Contract Documents.

4. Inspections, tests, special inspections and related actions specified in this Section and elsewhere in Contract Documents are not intended to limit a Contractor's quality control procedures which facilitate compliance with requirements of Contract Documents.
5. Requirements for quality control services by Contractor, as requested or to be requested by Architect/Engineer, Owner, governing authorities, or other authorized entities are not limited by provisions of this Section.
6. Contractors shall review and become familiar with the requirements of Article 13.5, Tests and Inspections, of the General and Supplementary Conditions covering the provisions for testing of the Work.

1.03 RESPONSIBILITIES:

- A. Contractor shall coordinate with independent testing agency performing inspections, tests, and quality control services.
 1. Construction Manager will schedule services of independent testing agency to perform services so specified. When no Construction Manager is hired by the Owner, it will be the Contractor's contractual responsibility to schedule the services of independent testing.
 2. The Owner will pay for services of the independent testing laboratory, awarded through the Owner's Representative. Source of services as well as payment and rates of payments will be as directed by the Owner's Representative. Testing specified herein shall be performed at a minimum. Construction Manager or Architect may request additional testing; payment for additional testing is subject to the provisions of the General Conditions.
- B. Retest Responsibility: Where results of required inspection, test, or similar service are unsatisfactory (do not indicate compliance of related work with requirements of Contract Documents), retests are responsibility of Contractor. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work. Retesting shall be performed by testing laboratory as directed by the Owner's Representative.
- C. Responsibility for Associated Services: Contractor is required to cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at project site.

- D. Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of work and without the need for removal/replacement of work to accommodate inspections and tests. It is the contractual responsibility of the Contractor to continually notify the Owner's Representative of all scheduling of times for inspections, tests, taking of samples, and similar activities.

1.04 SAMPLING AND TESTING (GENERAL):

1. Sampling and testing is required for the following Sections of Work and, unless otherwise indicated, shall be performed by an independent testing lab and paid for by the Owner through the Owner's Representative. ***Note: Certain sections indicated under this item also have specific BCNYS Special Testing & Inspection requirements, which shall be conducted in conformance with BCNYS Chapter 17 guidelines; all special testing & inspection costs shall be borne by the Owner. Refer to item 1.22 for the listing of special inspections required. Where an item may be duplicated under both general and special inspections, only one set of testing is required; special inspection requirements shall prevail.***
2. Section 02012 - Unclassified Excavation - Daily testing of in-situ soil, submitted to the Owner's Representative.
3. Section 02200 - Earthwork: Soil testing and inspection service during earthwork operations for subgrades and fill.
4. Section 02222 - Excavating, Backfilling & Compacting for Utilities: Testing at intervals not exceeding 200'-0" of trench for first and every other 8" lift of compacted trench backfill.
5. Section 02224 - Excavating, Backfilling & Compacting: Testing at intervals not exceeding 200'-0" of trench for first and every other 8" lift of compacted trench backfill. Refer to 02224, 3.09A for additional information.
6. Section 02230 - Paving Base Course: Field density testing, moisture & density relationship, mechanical analysis, plasticity index, base material, thickness and compaction, source testing. Refer to 02230, 3.02A-D for additional information.
7. Section 02602 - Asphalt Concrete: Testing paid for by General Contractor - Per 02602, 3.04B, testing of finished surface of the base course shall be accomplished by the GC; utilizing a 16 foot straight edge (a 10 foot straight edge used on vertical curves).

8. Section 02475 - Bituminous Concrete Pavement: Quality control testing of uncompacted asphalt concrete mix and in-place compacted pavement.
9. Section 03310 - Concrete Work: Inspection of reinforcing steel placement; field quality control of concrete; tests for concrete materials and mix design tests (slump, air content, temperature, compression test, compressive strength tests (cylinders) taken at 7 & 28 days. Testing of FF/FL floor tolerances.
10. Section 03311 - Concrete Curb: Random batch testing shall be made. Refer to 03311, 2.01.C.2 for additional information. ***Note: this item also has specific BCNYS Special Testing & Inspection requirements, which shall be conducted in conformance with BCNYS Chapter 17 guidelines; all special testing & inspection costs shall be borne by the Owner.***
11. Section 03650 - Underlayment Concrete: Field quality control slump testing and cubes tested in accordance with ASTM C109. Refer to 03650, 3.04 for additional information.
12. Section 04200 - Unit Masonry: Field quality control of unit masonry and masonry assemblies.
13. Section 05100 - Structural Metal Framing: Field quality control for welds; field quality control for high strength steel torqued bolted connections; field quality control for structural steel alignment.
14. Section 05120 - Structural Steel: Source quality control (per 05120, 1.02D) materials and fabrication procedures; Per 05120, 3.02 - Inspection of high-strength bolted connections, shop and field welding.
15. Section 05210 - Steel Joists & Joist Girders: Source quality control SJI (Steel Joist Institute) certifications through steel fabricator. Inspection of high-strength bolted connections, shop and field welding.
16. Section 05300 - Metal Decking: GC to supply certified shop drawings per Section 05300.
17. Section 05400 - Cold Formed Metal Framing: for field quality control.
18. Section 08520 - Aluminum Windows: Field quality control testing per 08520, 3.03.
19. Section 09910 - Paints: Field quality control for painting.
20. Section 15802 - Inspection, Testing & Balancing: HVAC Contractor to conduct testing per 15802, 1.01A.

21. Section 15411A - Plumbing Domestic Water Piping System: Plumbing Contractor to conduct testing per 15411A, 3.12.
22. Section 15412A - Plumbing Sanitary Piping System: Plumbing Contractor to conduct testing per 15412A, 3.11.
23. Section 15413A - Plumbing Storm Water Piping System: Plumbing Contractor to conduct testing per 15413A, 3.07.
24. Section 16010 - General Provisions - Electrical Contractor to conduct testing per 16010 requirements.
25. Section 16470 - Panelboards: Electrical Contractor to conduct testing per 16470, 3.01 requirements.
26. Section 16511 - Firestopping: Electrical Contractor to conduct testing per 16511, 1.05 requirements.
27. Section 16720 - Fire Alarm System: Electrical Contractor to conduct testing per 16720, 3.02 requirements.

Note: For those projects utilizing a Construction Manager, the Construction Manager's involvement with testing shall be limited to coordinating, documenting (recording the date, time, location and type of test being performed), witnessing, filing copies of reports prepared by the testing agency, and transmitting copies of the reports to the Owner. The reports shall be prepared by the testing agency in accordance with criteria established by 1.04 of this Section and BCNYS Chapter 17 and in a format approved by, the Architect/Engineer. Where no Construction Manager is retained, the coordination and documentation of all required tests shall be the complete and sole responsibility of the Prime Contractor responsible for the work being tested in conjunction with the testing agency.

Note: The Construction Manager will coordinate and document (recording the date, time, location and type of test being performed) all special inspections or testing as required by BCNYS Chapter 17 requirements.

- B. Additional Information: All Prime Contractors shall review all specifications of their disciplines for additional information concerning general testing services necessary for this project. The list provided above shall not be considered mutually exclusive.
- C. Test procedures to be used shall be submitted for approval of the Owner's Representative where other than those specified are recommended by the testing agency.

1.05 QUALIFICATION OF LABORATORY:

- A. Shall meet "Recommended Requirements of Independent Laboratory Qualifications," published by American Council of Independent Laboratories. For concrete and steel the laboratory shall comply with the basic requirements of ASTM E 329, "Standards of

Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."

- B. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of deficiencies reported by inspection.
- C. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to either:
 - 1. National Bureau of Standards.
 - 2. Accepted values of natural physical constants.
 - 3. Submit copy of certificate of calibration, made by accredited calibration agency.
- D. Refer to Section 01450 - *Testing Laboratory Services* for additional requirements.
- E. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract documents.
 - 2. Approve or accept portion of work.
 - 3. Perform duties of the Contractor.

1.06 SUBMITTALS:

- A. Testing document submittal procedures shall be as requested by the Construction Manager and the Architect.
- B. Promptly submit two (2) copies to the Owner's Representative (one (1) to be turned over to the Owner), two (2) copies directly to the Architect/Engineer, and one (1) to the Contractor of reports of inspections and test, including the following information, as applicable:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name and address.
 - 4. Name and signature of field inspector.
 - 5. Date of inspection or sampling.
 - 6. Record of temperature and weather.
 - 7. Name and signature of laboratory inspector.
 - 8. Identification of product and specification section.
 - 9. Location in project.

10. Designation of the work and test method.
11. Observations regarding compliance with Contract Documents.
12. Complete inspection or test data.
13. Test results and interpretation of test results.
14. Recommendation on retesting.

1.07 SOIL COMPACTION TESTING:

- A.** The Contractors for the Work of Division 2 specification - "Earthwork" shall cooperate and coordinate with the soil testing and inspection service for quality control testing during earthwork operations as follows:
1. Field density test reports.
 2. One optimum moisture-maximum density curve for each type of soil encountered.
 3. The Contractor shall arrange for Soils Engineer to be on the site for observation and testing during times when the following operations are being performed:
 - a. Proofrolling.
 - b. Compaction of subgrades and fill. During compaction operations, the Soils Engineer shall carefully monitor existing foundations to detect possible foundation movements. If movement is detected, Work shall be stopped and the Architect immediately notified.
- B.** Percentage of Maximum Density Requirements: Provide not less than following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place.
1. Foundations: Compact top 12 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 2. Building Slabs and Steps: Compact top 12 inches of subgrade and each 8 inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 3. Lawn, Unpaved Areas, and Borrow Pit: Compact top 6 inches of subgrade and 8 inch layer of backfill or fill material to 90 percent Modified Proctor maximum dry density.

4. Walkways: Compact top 6 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 5. Pavements: Compact top 12 inches of subgrade and each 8-inch layer of backfill or fill material to 95 percent Modified Proctor maximum dry density.
 6. Underground Utilities: Provide the preceding requirements for the respective utility location(s).
 7. Underground Piping and Conduit Outside Building:
 - a. Bedding shall begin by placing 4 to 6 inch bedding of the approved backfill material and compacting to between 85 to 90 percent of the Modified Proctor Maximum Dry Density. The width of the bedding shall be the diameter of the pipe plus 2 feet.
 - b. Haunching shall consist of placing the approved backfill material to the spring line of the pipe and conduit and compacting between 85 to 90 percent of the Modified Proctor Maximum Dry Density. This lift shall not exceed 9 inches loose. The pipe and conduit bedding and flow line shall not be disturbed as a result of the haunching operation.
 - c. Initial backfill shall consist of placing the approved backfill material to the top of the pipe and conduit and compacting to between 85 and 90 percent of the Modified Proctor Maximum Dry Density. This lift shall not exceed 9 inches loose. Crushed or buckled pipe and conduit as a result of the backfilling operations will be removed and replaced with no additional payment.
 - d. Initial backfill shall continue in 6-inch lifts with the approved backfill material to a depth of 12 inches above the pipe.
 - e. Finish backfilling of the trench shall consist of placing the approved backfill or material from the trench excavation in 6-inch lifts to the grade of the trench. Finish backfilling within paved areas shall continue to the base of the compacted aggregate with the approved backfill material.
 8. Retaining Walls: Compact each 8 inch layer of backfill or fill material to 95 percent Standard Proctor Maximum Dry Density.
- C. Quality Control Testing During Construction: Testing service must inspect and approve subgrades and fill layers before further

construction work is performed thereon. Tests of subgrades and fill layers will be taken as follows:

1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect, except that a minimum of one test shall be performed for each 15,000 sq.ft. of building area.
 2. Paved areas and Building Slab Subgrade: Make at least on field density test of subgrade for every 2,000 sq.ft. of paved area or building slab, but in no case less than 3 tests.
 3. Foundation and Retaining wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.
 4. Trench Backfill: For each compacted backfill layer make one field density test between each drainage structure.
- D. If, in the opinion of the Architect, based on reports of testing service and inspection, subgrade or fills which have been placed are below specified density, additional compaction work and testing shall be provided by the Contractor for the Section of Work involved at no additional expense, until subgrades or fills meet or exceed specified density.

1.08 BITUMINOUS PAVING TESTING:

- A. The Contractor for the Work of Division 2 specification "*Asphalt Pavement*" shall cooperate and coordinate with the testing laboratory to perform field inspection of the pavement work, unless specifically noted otherwise.
- B. Field quality control testing shall be performed during paving operations. Perform the following sampling and testing of asphalt concrete mixtures for quality control during paving operations. Record the locations where samples are taken to correlate with subsequent testing.
- C. Test uncompacted asphalt concrete mix and report the following:
 1. Sampling: AASHTO T168 (ASTM D979).
 2. Asphalt Cement Content: AASHTO T164 (ASTMD2172).
 3. Perform at least one initial test for paving, unless otherwise specified or directed.

- D. Test in-place, compacted pavement for density and thickness, as herein specified. Perform one test for each 500 sq.yds. but not less than one test per day, unless otherwise specified or directed.
- E. The Contractor shall pay for and perform additional Work and testing as may be required if any of the previous tests indicate insufficient values or if directed by the Architect. Continue Work and testing until specified values have been attained.
- F. Asphalt concentrate material not complying with specified requirements will not be acceptable. The Contractor shall repair or remove and replace defective paving as directed by the Architect, at no additional cost to the Owner.

1.09 INSPECTION OF REINFORCING STEEL PLACEMENT:

- A. The Contractor for the Work of Division 3 specifications for "Cast-In-Place Concrete" and "Concrete Work", shall cooperate and coordinate with the testing laboratory to perform field inspection of the placement of reinforcing steel prior to, and in some specified instances during the placement of concrete structures, unless specifically noted otherwise.
- B. Inspection shall include the following:
 - 1. All structures:
 - a. Size of all reinforcing bars.
 - b. Measurement of bar laps.
 - c. Spacing of reinforcing bars.
 - d. Measurement of reinforcing concrete cover.
 - e. Adequacy of reinforcement ties to prevent movement during concrete placement.
 - f. Placement of reinforcing chairs, bolsters, and concrete blocks supporting reinforcement.
 - g. Condition of reinforcing free of corrosion scale, grease, oil, and other foreign materials which would reduce bond of concrete to reinforcement.
 - 2. Slabs-on-Grade:
 - a. Nominal size of welded wire fabric.
 - b. Measurement of fabric lap.
 - c. Type, size, and spacing of supports for welded wire fabric.
 - d. Adequacy of maintaining welded wire fabric in correct position during the concrete placement. If concrete workers walk on fabric during concrete placement, is fabric lifted back in to correct position prior to set of concrete. (THE TESTING LABORATORY SHALL BE PRESENT DURING THE PLACEMENT OF SLABS-ON-GRADE, WHICH USE WELDED WIRE FABRIC OR REINFORCING STEEL BARS).
 - e. Slabs-on-grade with fibrous reinforcement do not require this inspection.

- C. The Testing Laboratory shall report inspection results in writing to the Architect, Construction Manager, and Contractor the same day that tests are made. Reports shall indicate the specific structural items inspected and the location, with column grid references, where possible to clearly identify the inspected items.
- D. Additional Inspections: Where inspections indicate deficiencies and concrete placement of any structural item is made without this required inspection, the testing laboratory shall conduct additional tests, including concrete coring, magnetic detection devices, sonic testing devices, and other methods as required to verify the conformance of the reinforcing steel placement to the Contract Documents. The Contractor shall pay for such inspections conducted and other additional inspections as may be required when unacceptable or un-inspected reinforcing steel placement is verified.

1.10 CONCRETE TESTING:

- A. The Contractor for the Work of Division 3 specification for "*Cast-In-Place Concrete*" and "*Concrete Work*", shall cooperate and coordinate with testing laboratory to perform field quality control testing during concrete work under Division 3.
- B. Quality Control Testing During Construction: Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - 1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 - 2. Slump: ASTM C143, one test for each concrete load at point of discharge, and one for each set of compressive strength test specimens.
 - 3. Air Content: ASTM C231, pressure method; one for every other concrete load at point of discharge or when the indication of change requires.
 - 4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees F. and above; and each time a set of compressive test specimens is made.
 - 5. Compression Test Specimens: ASTM C31, one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 6. Compressive Strength Tests: ASTM C39, one set for each day's placement exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds.

of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

- a. When the frequency of testing will provide less than 5 strength tests for a given mix design, conduct testing strength tests for a given mix design, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When the total quantity of a given mix design of concrete is less than 50 cu.yds., the strength tests may be waived by the Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 - c. When the strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- C. The testing laboratory shall report test results in writing to the Architect, Construction Manager, Contractor, and ready-mix supplier on the same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, type and amount of fibrous reinforcement, compressive breaking strength, and type of break for both 7 day tests and 28 day tests.
- D. Additional Tests: The testing service will make additional tests of in-place concrete, as directed by the Architect, when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42 or by load testing specified in ACI 318 or other acceptable nondestructive testing methods, as directed. The Contractor shall pay for such tests conducted and other additional testing as may be required, when unacceptable concrete is verified.
- E. Evaluation of Quality Control Tests: Do not use concrete delivered to the final point of placement, which has slump or total air content outside the specified values.
 - 1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of 3 consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the

type or class of concrete; and no individual strength test falls below the required compressive strength by more than 500 psi.

2. Strength tests of specimens cured under field conditions may be required by the Architect to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.
 - a. Provide improved means and procedures for protecting concrete when the 28 day compressive strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders.
 - b. When laboratory cured cylinder strengths are appreciably higher than the minimum required compressive strength, field cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
 - c. If individual tests of laboratory cured specimen produce strengths more than 500 psi below the required minimum compressive strength or if tests of field cured cylinders indicates deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
3. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength.

F. Deficient concrete shall be removed and replaced by the Contractor without additional cost to the Owner.

1.11 CONCRETE MATERIALS AND MIX DESIGN:

- A. Concrete Materials and Mix Design: The Contractor(s) for Division 3 specification "Cast-In-Place Concrete" and "Concrete Work" shall provide the following in conformance with the requirements of the Division 3 specifications:
 1. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94.
 2. Product Data: Submit copies of manufacturer's specifications with application and installation

instructions for proprietary materials and items, including admixtures, bonding agents, waterstops, joint systems, chemical floor hardeners, and dry shake finish materials.

3. Laboratory Test Reports: Submit copies of laboratory test reports for concrete materials and mix design tests. The Architect's review will be for general information only. Production of concrete to comply with specified requirements is the Contractor's responsibility.
4. Mix Design: Submit copies of concrete mix designs for each type of mix required by the Concrete Schedule indicating the amount of each ingredient (by weight) in one cubic yard of concrete, the calculated water/cement ratio, and the slump.

B. Tests for Concrete Materials:

1. For normal weight concrete, test aggregates by the methods of sampling and testing of ASTM C33.
2. For lightweight concrete, test aggregates by the methods of sampling and testing of ASTM C330.
 - a. For portland cement, sample the cement and determine the properties by the methods of test of ASTM C33.
3. Submit written reports for each material sampled and tested, prior to the start of Work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.

- C.** Submit signed statement from ready-mix plant that concrete furnished for the Project will exactly conform to the approved design mixes.

1.12 TESTS FOR FF/FL: Refer to Division 3 specification for "Cast-In-Place Concrete" and "Concrete Work".

1.13 TESTS FOR MORTAR:

- A.** The Contractor for the Work of Division 4 - "*Unit Masonry*", shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Division 4 - "*Unit Masonry*", unless specifically noted otherwise.

- B. For colored and noncolored mortars test for compressive strength by the methods of sampling and testing of ASTM C109 and ASTM C780.
 - 1. Provide a minimum of one set of cubes for testing per 5,000 sq.ft. of masonry wall construction and as directed by Architect.
- C. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
- D. If the compressive strength tests fail to meet the minimum requirements specified, the mortar represented by such tests will be considered deficient in strength.
- E. Deficient mortar shall be removed and replaced by the Contractor without additional cost to the Owner.

1.14 TESTS FOR GROUT:

- A. The Contractor for the Work of Division 4 - "*Unit Masonry*", shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under the Division 4 specification, which covers "*Masonry Grout*", unless specifically noted otherwise.
- B. Grout for filling reinforced or unreinforced concrete masonry cores or brick cavities test for compressive strength by methods as described in Division 4 section covering - "*Masonry Grout*".
 - 1. Provide a minimum of one set of 3 test specimens for testing per 5,000 square feet of masonry wall construction or for each ready-mix truck load of grout and as directed by the Architect.
- C. Submit written reports for each material sampled and tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, source of aggregates, material manufacturer and brand name for manufactured materials, values specified in the reference specification for each material, specific location where material represented by sample is used, slump and compression test results. Indicate whether or not material is acceptable for intended use.
- D. If the compressive strength tests fail to meet the minimum requirements specified, the grout represented by such tests shall be considered deficient in strength.
- E. Deficient grout shall be removed and replaced by the Contractor without additional cost to the Owner.

1.15 TESTS OF CONCRETE MASONRY PRISMS:

- A. The Contractor for the work of Division 4 specification - "*Unit Masonry*", shall cooperate with a separate testing laboratory to perform field quality control testing during the masonry work under Division 4 specification - "*Unit Masonry*".
- B. When required by the masonry plan, construct a set of 3 masonry prisms using mortar and concrete masonry units to be used in the masonry work. Unless otherwise noted, construct prisms 8 inches by 8 inches by 16 inches high (nominal) in compliance with ASTM E447, Method B.
- C. When prism tests are required to establish the strength of masonry in lieu of Masonry Inspection, provide a minimum of one set of 3 masonry prisms for testing for each 5000 sq.ft. (gross) of masonry wall construction.
- D. Submit written reports for each prism tested. Provide the project identification name and number, date of report, name of Contractor, name of testing service, name of material suppliers, specific location where masonry represented by the prism is used, compression test strength results, and specified required strength.
- E. If the compressive strength tests fail to meet the minimum strength specified in the Plans, the masonry represented by the tests shall be considered deficient.
- F. When tests indicating deficient masonry represent masonry already constructed, such masonry shall be removed and replaced by the Contractor without additional cost to the Owner. In lieu of removal and replacement, additional cores may be grouted as required and directed by the Architect without additional cost to the Owner.

1.16 MASONRY INSPECTION:

- A. Provide masonry construction inspection of concrete or brick masonry walls to insure that masonry construction is in conformance with the Contract Documents. Masonry inspection is required for those masonry elements, which must be constructed to attain high design strengths.
- B. Qualification of Inspection Agency: Refer to Section 01450 - "*Testing Laboratory Services*". Individual inspector shall be certified as a masonry construction inspector by the National Concrete Masonry Association or by a qualified state Masonry Institute or Association.
- C. Inspection shall use NCMA-TEK 18-3 Quality Assurance as a guideline.

- D. The individual or individuals who will perform the masonry inspection shall be present for the Pre-Masonry Conference.
- E. The masonry inspector shall prepare a written report or reports for each day of inspection. The format for this report shall be furnished by the Owner's Representative upon request.
- F. The masonry inspector shall be present and observe all masonry construction operations in walls requiring inspections. The masonry inspector shall be present at the project site within sufficient time, in advance of grouting operations, to inspect the construction to insure its conformance to the Contract Documents and that grouting may proceed. No grouting shall be permitted unless the masonry inspector is present and has indicated that the masonry construction is properly prepared for the grouting operation.

1.17 WELDING QUALITY CONTROL:

- A. Welding operators shall be qualified under the provisions of the AWS Structural Welding Code on test pieces in positions and with clearances equivalent to those actually to be encountered in construction. Welders shall make only those types of welds for which they are specifically certified.
- B. Welds requiring inspection shall be so indicated in the Drawings.
 - 1. Welds indicated as requiring visual inspection shall be visually inspected by an independent inspector, acceptable to the Architect, prequalified by the American Welding Society Qualification Test.
- C. The Contractor performing the welding requiring visual inspection shall coordinate with an independent testing service, acceptable to the Architect to perform weld testing.
- D. Submit written reports for each weld tested. Provide project identification and number, date of report, name of Welding Contractor, name of testing service, location of weld, type of weld, and test results. Indicate whether or not weld is acceptable for intended use.
- E. If by inspection welds fail to meet minimum acceptable criteria, the welds shall be cut out and replaced at no additional cost to the Owner.

1.18 BOLTED STRUCTURAL CONNECTIONS QUALITY CONTROL:

- A. The Contractor for the work of the Division 5 specification for "Structural Steel" shall cooperate with a separate testing laboratory, to perform field quality control inspection of slip-critical and snug-tight bolted connections.
- B. Inspection of slip-critical connections shall be visual. The inspector shall be present at the beginning of steel erection to

insure that the erector is conforming to the Contract Documents and AISC Specifications. The inspector shall verify that the erector is marking the bolts and nuts prior to the turn-of-nut procedure. Ten percent of all slip-critical bolted connections shall be observed as they are installed. Any connections, which, in the opinion of the inspector, do not meet the tightening requirements of the Contract Documents, shall be corrected by the erector.

1. Inspection of snug-tight connections shall be made by use of a spud wrench. Ten percent of all snug-tight bolted connections selected randomly over the entire limits of the building structure shall be tested to verify tightness. If more than 20 percent of the bolts tested do not meet the General Requirements of the Contract Documents, the erector shall be required to retighten all snug-tight bolted connections on the Project.

1.19 STRUCTURAL STEEL ALIGNMENT QUALITY CONTROL:

- A. The Contractor for the Work of the Division 5 specification section "*Structural Steel*", shall cooperate with a separate testing laboratory, to perform field measurement of structural steel beams, columns, joist, and deck alignment.
- B. Alignment shall be measured and compared to AISC "Code of Standard Practice for Steel Buildings and Bridges".
- C. The Testing Agency shall submit, to the Architect, a written report summarizing the measurements performed and the equipment used in the fieldwork. Where alignment fails to meet AISC requirements, the Contractor for the work in "Structural Metal Framing" shall make the required corrections.

1.20 COLD FORMED METAL FRAMING QUALITY CONTROL:

- A. The Contractor shall cooperate with a separate testing laboratory to perform field quality control inspections.
 1. Test and inspect cold formed metal framing used for exterior curtain wall system to verify framing meets the following specified and indicated items:
 - a. Thickness of framing members (gauge).
 - b. Spacing of framing members.
 - c. Attachment details of framing members to structural substrate.
 - d. Supplemental bracing and reinforcement is correctly provided including spacing, size and type of bracing and thickness of bracing.

1.21 PAINTING QUALITY CONTROL:

- A.** The Contractor for the Work of Section 09900 - "*Painting*", shall cooperate with a separate testing laboratory to perform field quality control testing of painted finishes.
- B.** Wet Film Thickness:
 - 1. Wet film thickness shall be tested at the rate of one reading per 1000 sq. ft. of painted surface. Ten random locations for readings will be chosen throughout building.
 - 2. Wet film thickness shall be as specified in Section 09900 - "*Painting*"; or if not specified, as specifically recommended by the paint manufacturer for the type of substrate, type of paint and system used, and application methods and coverage requirements.
 - 3. Testing Instrument:
 - a. Wet Film Thickness Gage, KTA-Tator, Inc., Pittsburgh, PA.
- C.** Dry Film Thickness:
 - 1. Dry film thickness shall be tested at the rate of 5 readings per 100 sq.ft. of painted surface. Twenty random locations for readings will be chosen throughout the building.
 - 2. Average of all readings for a given area or surface area to be within the dry film thickness range specified in Section 09910 - Paints, and no individual reading should be more than 20 percent below the specified dry film thickness.
 - 3. Testing instruments; shall be destructive or nondestructive type applicable for the type of substrate the coating is applied to. The following lists acceptable types of testing instruments:
 - a. Type 1, (Magnetic Pull-Off) Dry Film Thickness Gage, KTA-Tator, Inc., Pittsburgh, PA.
 - b. Fixed Probe Dry Film Thickness gage - Elcometer 345 Basic, KTA-Tator, Inc., Pittsburgh, PA.
 - c. Fixed Probe Dry Film Thickness Gage - Elcometer 345 Top, KTA-Tator, Inc., Pittsburgh, PA.
 - d. Fixed Probe Dry Film Thickness Gage Elcometer 300F-P2, KTA-Tator, Inc., Pittsburgh, PA.
 - e. Type II - Fixed Probe Dry Film Thickness Gage - Minitest 200F, KTA-Tator, Inc., Pittsburgh, PA.
 - f. Fixed Probe Dry Film Thickness Gage - Positector 6000-F1, KTA-Tator, Inc., Pittsburgh, PA.
 - g. Fixed Probe Dry Film Thickness Gage - Positector 6000-F3, KTA-Tator, Inc., Pittsburgh, PA.

- h. Fixed Probe Dry Film Thickness Gage - Quanix 2200, KTA-Tator, Inc., Pittsburgh, PA.
- i. Fixed Probe Dry Film Thickness Gage - Quanix 2300, KTA-Tator, Inc., Pittsburgh, PA.
- j. Destructive Dry Film Thickness - Tooke Gage, KTA-Tator, Inc., Pittsburgh, PA.

1.22 STRUCTURAL TESTING AND SPECIAL INSPECTION CONFORMANCE IN COMPLIANCE WITH BUILDING CODE OF NEW YORK STATE:

- A. **General:** *In addition to the above Division 2-16 general testing requirements, the provisions of Chapter 17, "Structural Tests and Special Inspections" of the Building Code of New York State (BCNYS) additionally governs the quality, workmanship and requirements for all materials, as applicable. Materials of construction and tests shall conform to the applicable standards listed in the BCNYS.*
- B. **New Materials:** New building materials, equipment, appliances, systems or methods of construction not provided for in the BCNYS, and any material of questioned suitability proposed for use in the construction of a building or structure shall be subjected to the tests prescribed in Chapter 17 of the BCNYS.
- C. **Used Materials:** The use of second-hand materials that meet the minimum requirements of Chapter 17 of the BCNYS shall be permitted.
- D. **Special Inspections** - All special inspections shall conform to the requirements of Section 1704 of Chapter 17 of the BCNYS. The Owner shall employ one or more Special Inspectors to provide inspections during construction on the types of work listed under Section 1704 of Chapter 17 of the BCNYS. The Special Inspector shall be a qualified person who shall demonstrate competence to the satisfaction of the code enforcement official for inspection of the particular type of construction or operation requiring special inspection. **Refer to Specification Section 01450, "Testing Laboratory Service" for the specific qualifications of the Special Inspector.**
- E. **Report Requirements:** Special inspectors shall keep records of all inspections, and shall furnish said records to the code enforcement official, to the Architect and the Owner. If a Construction Manager has been retained by the Owner, all test results shall be submitted in quadruplicate, via the Construction Manager. Reports shall indicate that work inspected was done in conformance to the approved Construction Documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the code enforcement official and to the Architect, prior to the completion of that phase of the work. A final report of inspections documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted periodically at a frequency agreed upon by the Owner, the Architect and Construction Manager, prior to the start of the work.
- F. **Inspection of Fabricators:** Where fabrication of structural load bearing

members and assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be required by Section 17, and as required elsewhere in the BCNYS.

- G. **Fabrication and Implementation Procedures:** The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to the approved construction documents and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.
- H. **Fabricator Approval:** Special inspections required by the BCNYS are not required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon the review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the code enforcement official, stating that the work was performed in accordance with the approved construction documents.

SPECIAL INSPECTIONS & TESTS – The table below summarizes the special inspections & testing requirements of the contract, in conformance with BCNYS 1704.1.1. The Owner shall pay for all Special Inspections & Tests indicated below. (Note: This chart includes all items indicated within the BCNYS as requiring special inspections. These inspections shall be performed for all work items that are included within the project scope of work. If there is testing indicated for a material or component that is not required on the project, then it follows that there is no testing required for that item on the particular project in question.)

A. Soils				1704.7
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.7 – Required Verification and Inspection of Soils)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
1. Verify materials below footings are adequate to achieve the design bearing capacity.		X		1704.7
2. Verify excavations are extended to proper depth and have reached proper material.		X		1704.7
3. Perform classification and testing of controlled fill materials.		X		1704.7
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X			1704.7

5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		X		1704.7
B. Foundation and Soil Investigations				1802.2
1. Questionable soil.	X			1802.2.1
2. Expansive soil.		X		1802.2.2
3. Groundwater table.		X		1802.2.3
4. Pile and pier foundations.	X			1802.2.4
5. Rock strata.		X		1802.2.5
6. Seismic Design Category C.		X		1802.2.6
7. Seismic Design Category D, E, F.		X		1802.2.7
C. Soil Classification		X		1802.3
D. Concrete Construction (per NYSBC Table 1704.4)				1704.4
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.4 – Required Verification and Inspection of Concrete Construction)	CONTINUOUS	PERIODIC	REFERENCE STANDARD (where applicable, see also Section 1707.1, special inspections for seismic resistance)	BCNYS REFERENCE
1. Inspection of reinforcing steel, including prestressing tendons and placement.		X	ACI 318; 3.5, 7.1-7.7	1913.4
2. Inspection of reinforcing steel welding, in accordance with Table 1704.3, Item 5B of BCNYS.			AWS D1.4, ACI 318; 3.5.2	
3. Inspection of bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased.	X			1911.5
4. Verify use of required design mix.		X	ACI 318; Ch.4, 5.2-5.4	1904.2.2, 1913.2, 1913.3
5. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X		ASTM C172, ASTM C31; ACI 318; 5.6, 5.8	1913.10
6. Inspection of concrete and shotcrete placement for proper application techniques.	X		ACI 318; 5.9, 5.10	1913.6, 1913.7, 1913.8
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI 318, 5.11, 5.13	1913.9
8. Inspection of prestressed concrete: a. Application of prestressing forces. b. Grouting of bonded prestressing tendons in the Seismic-force-resisting system.	X X		ACI 318; 18.20: ACI 318; 18.18.4	
9. Erection of precast concrete members.		X	ACI 318; Ch. 16	
10. Verification of in-situ concrete strength prior to stressing of tendons in posttensioned concrete and prior to removal of shores and forms from beams and structural slabs.		X	ACI 318; 6.2	
11. Inspect formwork for shape, location and dimensions of the concrete member being formed.		X	ACI 318; 6.1.1	
E. Pile Foundations: Installation and load tests.				1704.8

INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.8 – Required Verification and Inspection of Pile Foundations)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE
1. Verify pile materials, sizes and lengths comply with requirements.	X				
2. Determine capacities of test piles and conduct additional load tests, as required.	X				
3. Observe driving operations and maintain complete and accurate records for each pile.	X				
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document and pile damage.	X				
5. For steel piles, perform additional inspections in accordance with Section 1704.3.					1704.3
6. For concrete piles and concrete filled piles perform additional inspections in accordance with Section 1704.4					1704.4
7. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.					
8. For augured uncased piles and caisson piles, perform inspections in accordance with Section 104.9					1704.9
F. Pier Foundations: Seismic Design Category C, D, E, F					1704.9
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.9 – Required Verification and Inspection of Pier Foundations)	CONTINUOUS	PERIODIC	REFERENCE STANDARD		BCNYS REFERENCE
1. Observe drilling operations and maintain complete and accurate records for each pier.	X				
2. Verify placement locations and plumbness, confirm pier diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end bearing strata capacity.	X				
3. For concrete piers, perform additional inspections in accordance with Section 1704.4					1704.4
4. For masonry piers, perform additional inspections in accordance with Section 1704.5					1704.5
G. Masonry Construction					
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) L1 = Level 1 Inspection required for empirically designed & nonessential facilities. (Per NYSBC Table 1704.5.1)	CONTINUOUS	PERIODIC	ACI 530/ASCE5 / TMS 402, BCNYS Ch. 35	ACI 530.1/ASCE6 / TMS 602, BCNYS Ch. 35	BCNYS REFERENCE E

1. As masonry construction begins, the following shall be verified, to ensure compliance:					
a. Proportions of site-prepared mortar.		X		2.6A	
b. Construction of mortar joints.		X		3.3B	
c. Location or reinforcement, connectors, prestressing tendons and anchorages.		X		3.4, 3.6A	
d. Prestressing technique.		X		3.6B	
e. Grade and size of prestressing tendons and anchorages.		X		2.4B, 2.4H	
2. The Inspection Program shall verify:					
a. Size and location of structural elements.		X		3.3G	
b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	1.2.2(e), 2.1.4, 3.1.6		
c. Specified size, grade and type of reinforcement.		X	1.13	2.4, 3.4	
d. Welding of reinforcing bars.	X		2.1.10.7.2, 3.3.3.4(b)		
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)		X		1.8C, 1.8D	2104.3, 2104.4
f. Application and measurement of prestressing force.		X		3.6B	
3. Prior to grouting, the following shall be verified to ensure compliance:					
a. Grout space is clean.		X		3.2D	
b. Placement of reinforcement and connectors and prestressing tendons and anchorages.		X	1.13	3.4	
c. Proportions of site prepared grout and prestressing grout for bonded tendons.		X		2.6B	
d. Construction of mortar joints.		X		3.3B	
4. Grout placement shall be verified to ensure compliance with code and construction document provisions.	X			3.5	
a. Grouting of prestressing bonded tendons.	X			3.6C	
5. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X			1.4	2105.2.2, 2105.3
6. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		X		1.5	
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) L2 = Level 2 Inspection required for essential facilities. See 1704.5 for clarification. (Per NYSBC Table 1704.5.3)	CONTINUOUS	PERIODIC	ACI 530/ASCE5 / TMS 402, BCNYS Ch. 35	ACI 530.1/ASCE6 / TMS 602, BCNYS Ch. 35	BCNYS REFERENCE
1. From the beginning of masonry construction, the following shall be verified to ensure compliance:					
a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons.		X		2.6A	
b. Placement of masonry units and construction of mortar joints.		X		3.3B	
c. Placement of reinforcement, connectors and prestressing tendons and anchorages.		X	1.13	3.4, 3.6A	
d. Grout space prior to grouting.	X			3.2D	
e. Placement of grout.	X			3.5	

f. Placement of prestressing grout.	X			3.6C	
2. The Inspection Program shall verify:					
a. Size and location of structural elements.		X		3.3G	
b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	X		1.2.2(e), 2.1.4, 3.1.6		
c. Specified size, grade and type of reinforcement.		X	1.13	2.4, 3.4	
d. Welding of reinforcing bars.	X		2.1.10.7.2, 3.3.3.4(b)		
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)		X		1.8C, 1.8D	2104.3, 2104.4
f. Application and measurement of prestressing force.	X			3.6B	
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X			1.4	2105.2.2, 2105.3
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		X		1.5	
H. Steel Construction (per NYSBC Table 1704.3)					
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS) (Table 1704.3 – Required Verification and Inspection of Steel Construction)	CONTINUOUS	PERIODIC	REFERENCE STANDARD (where applicable, see also Section 1707.1, special inspections for seismic resistance)		BCNYS REFERENCE
1. Material verification of high-strength bolts, nuts & washers:					
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		X	Applicable ASTM material specifications. AISC 360, Section a3.3		
b. Manufacturer's certificate of compliance required.		X			
2. Inspection of high-strength bolting:					
a. Bearing-type connections.		X	AISC 360, Section M2.5	1704.3.3	
b. Slip-critical connections.	X	X			
3. Material verification of structural steel:					
a. Identification markings to conform to ASTM standards specified in the approved construction documents.			ASTM A6 or A568	1708.4	
b. Manufacturer's certified mill test reports.			ASTM A6 or A568		
4. Material verification of weld filler materials:					
a. Identification markings to conform to AWS specification in the approved construction documents.			AISC 360, Section A3.5		
b. Manufacturer's certificate of compliance required.					
5. Inspection of welding.					
a. <u>Structural Steel</u> :					
1) Complete & partial penetration groove welds.	X		AWS D1.1	1704.3.1	
2) Multi-pass fillet welds.	X				
3) Single-pass fillet welds > 5/16"	X				
4) Single-pass fillet welds < 5/16"		X			
5) Floor and deck welds.		X			
b. <u>Reinforcing Steel</u> :					
1) Verification of weldability of reinforcing steel other than ASTM A706.		X	AWS D1.4, ACI 318:3.5.2		

2) Reinforcing steel-resisting flexural & axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls & shear reinforcement.	X			
3) Shear Reinforcement.	X			
4) Other reinforcing steel.		X		
6. Inspection of steel frame joint details for compliance with approved construction documents: a. Details such as bracing & stiffening. b. Member locations. c. Application of joint details at each connection.		X		1704.3.2
I. Wood Construction: Fabrication of wood structural elements & assemblies.				1704.6, 1704.2
J. Sprayed Fire-Resistant Materials				1704.10
1. Structural member surface conditions.				1704.10.1
2. Application.				1704.10.2
3. Thickness.			ASTM E 605	1704.10.3
4. Density.			ASTM E 605	1704.10.4
5. Bond Strength.			ASTM E 736	1704.10.5
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
K. Mastic and intumescent fire-resistant coatings			AWCI 12-B	1704.11
L. Exterior Insulation and Finish Systems (EIFS)				1704.12
M. Special Cases (unusual in it's nature)				1704.13
N. Smoke Control Systems (Ductwork)				1704.14
O. Special Inspections for Seismic Resistance: Applicable to specific structures, systems and components (Seismic Category C, D, E, F) **				1707
1. Structural steel (welding).	X		AISC 341	1707.2
2. Structural wood.	X	X		1707.3
3. Cold-formed steel framing.		X		1707.4
4. Pier Foundations a. During placement of reinforcement. b. During placement of concrete.	X	X		1707.5
5. Storage racks & access floors.		X		1707.6
6. Architectural components.		X		1707.7
7. Mechanical & electrical components.		X		1707.8
8. Designated seismic system verifications.				1707.9, 1708.5
9. Seismic isolation system.		X		1707.10
P. Structural Testing for Seismic Resistance: Applicable to specific structures, systems and components. (Seismic Category C, D, E, F) **				1708
1. Testing and verification of masonry materials and assemblies. (Level 1, 2 or 3)				1708.1
2. Testing for seismic resistance.				1708.2

3. Reinforcing and prestressing steel.			ACI 318, ACI 318:3.5.2	1708.3,
4. Structural steel.			AISC 341; AWS D1.1, ASTM A435, A898	1708.4
5. Mechanical & electrical equipment.				1708.5
6. Seismically isolated structures.			Section 17.8 ASCE 7	1708.6
INSPECTION AND TESTING (Continuous & Periodic is as defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE
Q. Structural Observations: Applicable to specific structures. (Seismic Category C, D, E, F) **				1709
R. Design Strengths of Materials			All design strengths and permissible stresses of any structural materials shall conform to the specifications and methods of design of accepted engineering practice or the approved rules in the absence of applicable standards.	1710.1
a. New Materials			For materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests as provided for in Section 1711.	1710.2; 1711
S. Alternative Test Procedures			Provide duly authenticated reports from approved agencies in respect to the quality & manner of use of new materials or assemblies as provided for in Section 104.11. Costs of all tests and other investigations required under the provisions of this code shall be borne by the Owner.	1711.1
T. Test Safe Load				1712.1
U. In-Situ Load Tests (Completed Building or Structure)				1713.1, NYSBC Chapter 35
V. Preconstruction Load Tests (Structural Adequacy)				1714, NYSBC Chapter 35
a. Load Test Procedures specified				1714.2
b. Load Test Procedures not specified				1714.3
c. Wall and partition assemblies				1714.4
d. Exterior window & door assemblies				1714.5
e. Test Specimens				1714.6
W. Material & Test Standards				1715
a. Joist Hangers & Connectors				1715.1
b. Concrete and Clay Roof Tiles				1715.2
X. Other (List)				

End				

**** - For Seismic Classification, see Code Analysis located within the Construction Drawings.**

Note: For projects utilizing a Construction Manager, the Construction Manager's involvement with Special Inspections and Testing shall be limited to documenting, witnessing, acquiring and filing copies of all reports prepared by the Special Inspectors and testing agencies, and sequentially transmitting copies of the reports to the Architect and the Owner. All reports shall be prepared and certified by the Special Inspector and Testing Agency in accordance with criteria established by, and in a format approved by, the Architect/Engineer, in complete conformance with the requirements of BCNYS Chapter 17, Section 1704. Where no Construction Manager is retained, coordination and documentation of tests shall be the sole responsibility of the Prime Contractor responsible for the work being tested, in conjunction with the testing agency's Special Inspector.

1.23 QUALITY ASSURANCE FOR WIND REQUIREMENTS:

A. Each of the main wind force-resisting systems that are identified within the construction documents are subject to special inspections and testing, in accordance with Section 1704 and other applicable sections of the Building Code of New York State.

B. Wind force-resisting systems include the following; (refer to construction documents for more specific information concerning systems contained within a specific project.)

1. Roof cladding and roof framing connections;
2. Wall connections to roof and floor diaphragms and framing.
3. Roof and floor diaphragm systems, including collectors, drag struts and boundary systems.
4. Vertical windforce-resisting systems, including braced frames, moment frames and shear walls.
5. Windforce-resisting system connections to the foundation.
6. Fabrication and installation of components and assemblies required to meet the impact resistance requirements of Section 1609.1.4 of the BCNYS.

Exception: Fabrication of manufactured components and assemblies that have a label indicating compliance with the wind-load and impact-resistance requirements of the BCNYS.

C. Special inspections and testing, observations, frequency and distribution of reports shall be as indicated within other areas of this section.

D. **Contractor Responsibility:** Each contractor responsible for the construction of a main wind force-resisting component listed in the

quality assurance plan shall submit a written contractor's statement of responsibility to the code enforcement official and to the Owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgement of awareness of the special requirements contained in the quality assurance plan;
2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the code enforcement official;
3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting, and the distribution of the reports;
4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

1.24 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE (Section 1707 of BCNYS):

A. Special Inspections for Seismic Resistance: Special inspection as specified herein is required for the following, where required in Section 1704.1 of BCNYS. Special inspections itemized in Sections 1707.2 through 1707.8 of the BCNYS are required for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1616 of the BCNYS.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Sections 1707.6 and 1707.7 of the BCNYS.

B. For Seismic Classification specific to this project, see Code Analysis located within the Construction Drawings.

PART 2 - PRODUCTS - (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 - REPAIR AND PROTECTION:

A. General: Upon completion of inspection, testing, sample-taking and similar services performed on Work, repair damaged work and restore substrates and finishes to eliminate deficiencies including defects in visual qualities of exposed finishes. Except as otherwise indicated, comply with the requirements of the "Cutting and Patching" specification. Protect work exposed by or for service activities and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of assignment of responsibility for inspection, testing or

similar service.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Construction facilities provided by Prime Contractor as required by Prime Contract:
 - a. Temporary utilities:
 1. Temporary sanitary facilities.
 - b. Construction aids:
 1. Temporary ramps, ladders, and runways.
 2. Material lifting equipment (i.e. hoists, cranes, and similar items).
 3. Temporary scaffolding and platforms.
 - c. Barriers:
 1. Temporary enclosures and barricades, including protection for existing trees and plants to remain.
 2. Temporary enclosures and barricades within existing building.
 - d. Controls:
 1. Construction cleaning and rubbish removal, including providing and maintaining rubbish chutes and rubbish containers.
 2. Dust control, erosion and sediment control, and noise, pest, and pollution control.
 - e. Other temporary equipment, facilities, controls, and similar items required to complete contract requirements or specified in other section of project manual.

B. Placement, Relocation, and Removal:

1. Unless otherwise directed by the Project Representative, locate construction facilities and temporary controls to avoid interference with the work of this project, future projects indicated in the Contract Documents, and the Owner's activities on site.

2. Should change in location of construction facilities and temporary controls be necessary, relocation shall be accomplished by Prime Contractor providing facility or control without addition cost to Owner.
3. When no longer required, each Prime Contractor shall remove construction facilities and temporary controls provided by the Prime Contractor and shall remove all debris and restore area to original conditions, unless otherwise indicated in the Contract Documents.

1.02 TEMPORARY UTILITIES

- A. Sanitary Facilities: use toilet in existing building designated by Owner for use by Prime Contractor personnel.
- B. Telephone Service: Owner's telephones are not available for use by Contractor personnel.
 1. Public telephones within existing buildings are available for use by Prime Contractor personnel.

1.03 CONSTRUCTION AIDS

- A. Installation and maintenance for construction aids in accordance with applicable New York State Labor Laws, OSHA regulations, and other federal, state, and local laws, and maintenance of construction aids in safe condition shall remain exclusive responsibility of Prime Contractor providing construction aid.
- B. Ramps, Ladders, and Runways:
 1. Comply with New York State Labor Laws, OSHA regulation, and other applicable federal, state, and local laws.
 2. Remove as soon as possible and replace with permanent facilities where appropriate.
- C. Material Lifting Equipment: Provide equipment as required complying with New York State Labor Laws, OSHA regulations, and other applicable federal, state, and local laws.
- D. Scaffolding and Platforms: Provide equipment as required complying with New York State Labor Laws, OSHA regulations, and other applicable federal, state, and local laws.
- E. Rubbish Chutes:
 1. Install and maintain wooden to steel chute(s) terminating in hopper or rubbish container, properly fastened to building, and enclosed over full length with openings as required for access.
 2. Provide protective covering for building wall beneath and at least 2 ft. on both sides of chute extending full length of chute.

1.04 BARRIERS AND ENCLOSURES

- A. Interior Temporary Partitions and Closures: Provide temporary partitions and ceilings as required to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture from construction areas into Owner-occupied areas, and to prevent damage to existing areas and equipment.
 - 1. Construction with steel studs and 1/2" thick gypsum board on both sides with taped joints.
 - 2. Locate partitions as shown on drawings; if not shown on drawings, review location of partitions with the Architect and the Owner before beginning installation.
- B. Removal: Upon completion of construction at site, remove barriers, fencing, and closures/enclosures, and patch existing surfaces to match adjacent undisturbed surfaces.

1.06 TEMPORARY CONTROLS

- A. Construction Cleaning and Rubbish Removal:
 - 1. Provide continuous cleaning of rubbish, construction debris, and waste material resulting from construction work; place rubbish chutes or covered containers, located convenient to Prime Contractor's construction areas as approved by Owner.
 - a. Definition of "rubbish, construction debris, and waste materials": Material not intended or necessary for completion of the project, including, but not limited to, such as packing materials, lunch papers, drinking cups, and similar items.
 - b. Frequency of cleaning: At least daily during construction, clean up rubbish, construction debris, and waste materials around bottom of chutes or containers, within structure, and around site and access routes.
 - c. Comply with local and state ordinances, regulations, and laws, and with OSHA anti-pollution laws regarding clean up and disposal operations.
 - d. Where surfaces are to be cleaned, use materials recommended by manufacturer.
 - e. Remove debris and rubbish from pipe chases, plenums, attics, and crawl spaces prior to closing space.
 - f. Vacuum clean interior areas prior to start of surface finishing and continuous cleaning as required as finishing progresses.
 - g. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

Sprinkle dust rubbish with water.

2. Lower waste material in controlled manner with as few handlings as possible; do not drop or throw from heights.
 3. At least once a week, remove from site all rubbish, construction debris, and waste materials, including contents of containers, and dispose of legally.
 - a. Remove rubbish, construction debris, and waste materials more frequently if such materials present hazard or interfere with construction of other Prime Contractors.
 - b. Do not burn or bury rubbish, construction debris, and waste materials on site.
 - c. Do not dispose of volatile fluid waste (i.e. mineral spirits, oil, paint thinner, and similar materials) in storm or sanitary sewer systems or into streams or waterways.
- B. Dust Control: Provide methods to minimize raising dust from construction operations. Provide positive means to prevent airborne dust from dispersing into atmosphere.
- C. Fire Protection and Prevention:
1. Store volatile waste in covered metal containers and remove from premises daily in compliance with local and state ordinances and laws and with OSHA requirements.
 2. Locate and maintain gasoline and fuel oil storage facilities in full compliance with local and state ordinances and laws with OSHA requirements.
 3. Take all precautions required to prevent fires as a result of construction operations; operate flame cutting torches, blow torches, welding tools, and similar equipment in strict accordance with applicable safety rules and regulations.
 - a. Prime Contract using welding tools or torches of any type shall provide and maintain in usable condition at all times in the immediate vicinity of operations a fire extinguisher of the "Multi-Purpose Type ABC".
 4. Each Prime Contractor shall provide fire extinguishers in working order located at intervals throughout construction operations which shall not be removed from their mounting except to be tested or for purpose of fighting fire.
 - a. Relocate as necessary as work progresses.
 - b. Fire extinguishers remain the property of the Prime Contractor providing them.
- D. Vehicle Parking: Locate vehicles used on project site in locations which will not introduce exhaust gases into portions of building occupied by Owner and not involved in the project.

1.07 FIELD OFFICES AND SHEDS

A. Contractor's Field Offices and Sheds:

1. Each Prime Contractor shall provide and maintain such offices, storage sheds, and similar temporary buildings and trailers on site as required for his own use.
 - a. Existing grass or paved areas at the site shall be designated by Owner as Prime Contractor staging area, including location of material storage and field offices: review requirements with Owner prior to moving onto site.
 - b. Prime Contractors are advised that space within existing buildings will not be available for their use for storage of materials or similar uses.
2. Upon completion of construction at site, remove offices, storage sheds, and similar temporary buildings and trailers in site and patch existing surfaces to match adjacent undisturbed surfaces.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01550 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 - Specification Sections, apply to work of this Section.
- B. The work must comply with the requirements of the following related specifications sections when applicable:
 - 1. Division 1 Section 01050 - *"Uniform Safety Standards for School Construction and Maintenance Projects - Commissioner's Regulations"*
 - 2. Division 1 Section 01352 - *"LEED Requirements"* for additional LEED requirements. *(For LEED Certified Projects)*
 - 3. Division 1 Section 01524 - *"Construction Waste Management"* for recycling construction waste. *(For LEED Certified Projects)*

1.02 DESCRIPTION OF WORK

- A. Extent of selective demolition work is indicated on drawings and/or specified herein.

1.03 SUBMITTALS

- A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review and approval prior to commencement of work.
- B. See Section 01524 for additional submittal requirements for LEED Projects.

1.04 JOB CONDITIONS

- A. Occupancy: Owner will be occupying areas of the building immediately adjacent to areas of selective demolition. Demolition work must be conducted in a manner to minimize disruption of normal Owner's operations.
- B. Exits: All exits must be kept clear and maintained.
- C. Protection: Provide temporary barricades and other forms of protection as required to protect Owner's personnel, staff and General Public from injury due to selective demolition work and new construction.

1. Prevent dust and dirt from rising and entering the building.
 2. Protect adjacent floor areas with suitable coverings.
- D. All work in an Educational Facility must comply with the Commissioners Regulations and Uniform Safety Standards for School Construction and Maintenance Projects. Reference Section 01050 for additional information.
- E. Project Waste: All project waste and rubbish to be disposed in containers provided by the Contractor for subsequent legal off site disposal in accordance with Specifications Sections 01352 and 01524. Container locations to be coordinated with the Owner. Off site disposal must be on a regular basis.
- F. Damage: Promptly repair or replace areas that are to remain and are damaged by demolition or removal work.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which work of this Section will be performed for any interferences, or conditions which will be detrimental to timely and proper completion of the work.
- B. Report any interferences or unsatisfactory conditions to the Architect in writing. Do not proceed until interferences or unsatisfactory conditions have been removed or corrected.

3.02 PREPARATION

- A. Erect and maintain dust-proof closures to prevent the spread of dust to adjacent areas.

3.03 DEMOLITION

- A. Perform selective demolition work in a systematic manner.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

- A. Each day, remove debris, rubbish, and other materials resulting from demolition operations from building in accordance with Specifications Sections 01352 and 01524. Material to be disposed in containers provided by the Contractor. (*For LEED Certified Projects*)

3.05 CLEAN UP

- A. Upon completion of demolition work, remove tools, equipment and all remaining demolished materials from site. Leave areas broom clean.

END OF SECTION

SECTION 01609 - LEAD CONTAINING MATERIALS ABATEMENT

PART 1: GENERAL

1.1 DEFINITIONS

A. The following commonly used terms are defined in the context of these performance specifications.

1. AALA: American Association for Laboratory Accreditation. Also known as A2LA.
2. Abatement: For the purposes of these specifications the term "Abatement" is defined as the mitigation of the lead hazard by means described in the HUD Guidelines. This is not the same as the EPA definition of abatement as it appears in 40 CFR Part 745.
3. Accredited laboratory: A laboratory that has been evaluated and approved by the National Lead Laboratory Accreditation Program (NLLAP), to perform lead measurement or analysis, usually over a specified period of time.
4. Adhesion: The ability of dry paint or other coating to attach to a surface and remain fixed on it without blistering, flaking, cracking, or being susceptible to removal by tape.
5. Administrative removal: The temporary removal of workers from the job to prevent the concentration of lead in their blood from reaching levels requiring medical removal.
6. AIHA: American Industrial Hygiene Association.
7. Apparent Lead Concentration (ALC): The x-ray fluorescence (XRF) reading or average of more than one reading on a painted surface. See also XRF analyzer, Substrate Equivalent Lead (SEL), and Corrected Lead Concentration (CLC).
8. Bare soil: Soil not covered with grass, sod, some other similar vegetation, or paving, including the sand in sandboxes.
9. Binder: Solid ingredients in a coating that hold the pigment particles in suspension and bind them to the substrate. Binders used in paints and coatings include oil, alkyd, acrylic, latex, and epoxy. The nature and amount of binder determines many of the coatings performance properties-washability, toughness, adhesion, gloss, etc.
10. Biological monitoring: The analysis of blood, urine, or both to determine the level of lead contamination in the body. Blood lead levels are expressed in micrograms of lead per deciliter (one-tenth of a liter) of blood, or ug/dL. They are also expressed in micro moles per liter (umol/L).
11. Blood lead threshold: Any blood lead level greater than or equal to 10 ug/dL as defined by the Centers for Disease Control and Prevention. See also Elevated Blood Lead level (EEL) child.
12. Building component: Any element of a building that may be painted or have dust on its surface, e.g. walls, stair treads, floors, railings, doors, window sills, etc.

13. Certified Industrial Hygienist (CIH): A person who has passed the 2-day certification exam of the American Board of Hygiene, and who has at least 4 years of experience in industrial hygiene and a graduate degree or a total of 5 years of experience. See also Industrial hygienist.
14. Chalking: The photo-oxidation of paint binders (usually due to weathering) that causes a powder to form on the surface.
15. Characteristics (of hazardous waste): EPA has identified four characteristics of hazardous waste: ignitability, corrosivity, reactivity, and toxicity (as determined by the TCLP test). Any solid waste that exhibits at least one of these characteristics may be classified as hazardous under the Resource Conservation and Recovery Act (RCRA), depending on how the waste is produced and what quantities are generated. See also Toxicity Characteristic Leaching Procedure (TCLP).
16. Clearing: The process of using a HEPA vacuum and wet cleaning agents to removal leaded dust; the process includes the removal of bulk debris from the work area. OSHA prohibits the use of compressed air to clean lead-contaminated dust from a surface.
17. Clearance examination: Visual examination and collection of environmental samples by an inspector or risk assessor and analysis by an accredited laboratory upon completion of an abatement project, interim control intervention, maintenance job that disturbs lead-based paint (or paint suspected of being lead-based). The clearance examination is performed to ensure that the lead exposure levels do not exceed standards established by the EPA Administrator pursuant to Title IV of the Toxic Substances Control Act, and that any cleaning following such works adequately meets those standards.
18. Clearance examiner: A person who conducts clearance examinations following lead based paint hazard control and cleanup work, usually a certified risk assessor or a certified inspector.
19. Code of Federal Regulations (CFR): The codification of the regulations of Federal agencies. The regulations are published in the Federal Register. See also Federal Register (FR).
20. Cohesion: Ability of a substance to adhere to itself; internal adhesion; the force holding a substance together.
21. Common area: A room or area that is accessible to all residents in a community (e.g. hallways, or lobbies); in general, any area not kept locked.
22. Competent person: As defined in the OSHA Lead Construction Standard (29 CFR 1926.62), a person who is capable of identifying or predicting hazardous working conditions and work areas, and who has authorization to take prompt, corrective measures to eliminate the hazards. A competent person is not necessarily a risk assessor, or inspector, or abatement project supervisor.
23. Compliance plan: A document that describes the types of tasks, workers, protective measures, and tools and other materials that may be employed in lead-based paint hazard control to comply with the OSHA Lead Exposure in Construction standard.
24. Containment: A process to protect workers and the environment by controlling exposures to the lead-contaminated dust and debris created during abatement, see worksite preparation level.

25. Contingency plan: A document that describes an organized, planned and coordinated course of action to be taken during any event that threatens human health or the environment, such as a fire, explosion, or the release of hazardous waste or its constituents from a treatment, storage, or disposal facility.
26. Contractor: means any business entity or person performing the actual abatement project.
27. Corrected Lead Concentration (CLC): The absolute difference between the Apparent Lead Concentration and the Substrate Equivalent Lead. See also Apparent Lead Concentration (ACL) and Substrate Equivalent Lead (SEL).
28. Decontamination enclosure system: A series of connected rooms, for the decontamination of workers or of materials and equipment. Except where specified otherwise, decontamination enclosure system will contain at least one air lock.
29. Deteriorated lead-based paint: Any lead-based paint coating on a damaged or deteriorated surface or fixture, or any interior or exterior lead-based paint that is peeling, chipping, blistering, flaking, worn, chalking, alligating, cracking, or otherwise becoming separated from the substance.
30. Discharge or Hazardous Waste Discharge: The accidental or intentional spilling, emitting or dumping of hazardous wastes onto any land or water.
31. Dispersal: The discharge, deposit, injecting, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that any constituent thereof may enter the environment or be emitted into the air or discharge in waters.
32. Disposal (of hazardous waste): The discharge, deposit, injection, dumping, spilling, leaking, or placement of solid or hazardous waste on land or in water so that none of its constituents can pollute the environment by being emitted into the air or discharged into a body of water, including groundwater.
33. Disposal facility: A facility or part of one in which hazardous waste is placed on land or in water to remain there after the facility closes.
34. Elevated Blood Lead Level (EEL) child: A child who has a blood level greater than or equal to 20 ug/dL or a persistent 15 ug/dL. See also Blood lead threshold.
35. Encapsulation: Any covering or coating that acts as a barrier between lead-based paint and the environment, the durability of which relies on adhesion and the integrity of the existing bonds between multiple layers of paint and between the paint and the substrate. See also Enclosure.
36. Enclosure: The use of rigid, durable, construction materials that are mechanically fastened to the substrate to act as a barrier between the lead-based paint and the environment.
37. Engineering controls: Measures other than respiratory protection or administrative controls that are implemented at the work site, to lead-contaminated dust and debris usually in the occupational health setting. The measures include process and product substitution, isolation, and ventilation.
38. Evaluation: Risk assessment, paint inspection, reevaluation, investigation, clearance examination, or risk assessment screen.

39. Exposure monitoring: The sampling and analysis of air both inside and outside the work area to determine the degree of worker and resident exposure to lead or other airborne contaminants, often involving air sampling inside a workers breathing zone.
40. Exterior work area: For lead hazard control work, the exterior work area includes any exterior building components, such as a porch or stairway; the safety perimeter; and access barriers.
41. Facility: All buildings, contiguous land, structures, and other appurtenances, as well as any improvements, where lead-based paint or hazardous waste is treated, stored, or disposed. A facility may consist of several different treatment, storage or disposal units, such as landfills and surface impoundments.
42. Federal Register (FR): A daily Federal publication that contains proposed and final regulations, rules, and notices.
43. Generator: Any person whose act or operation produces hazardous waste identified or listed in 40 CFR Part 261 or whose act causes a hazardous waste to come under regulation (40 CFR 260.20).
44. Generator identification number: The unique number assigned by EPA to each generator, transporter of hazardous waste, and treatment, storage, or disposal facility.
45. Hazardous waste: As defined in EPA regulation (40 CFR 216.3), hazardous waste is solid waste or a combination of solid wastes that because of its quantity; concentration; or physical, chemical, or infectious characteristics may cause or contribute to increases in mortality, serious and irreversible or incapacitating but reversible illnesses, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed. As defined in the regulations, solid waste is hazardous if it meets one of four conditions; (1) exhibits a characteristic of hazardous wastes (40 CFR Sections 261.20 through 261.24); (2) has been listed as hazardous (40 CFR Section 261.31 through 261.33); (3) is a mixture containing a listed hazardous waste combined with a non-hazardous solid waste; and (4) is not excluded from regulation as hazardous waste. For lead-based paint abatement waste, hazardous waste is waste that contains more than 5 ppm of leach able lead as determined by the TCLP test, or is waste that is corrosive, ignitable or reactive and not otherwise noted. See also RCRA.
46. Heat gun: A device capable of heating lead-based paint causing it to separate from the substrate. For lead hazard control work, the heat stream leaving the gun should not exceed 1,100 F (some authorities may use a different temperature).
47. HEPA/wet wash/HAPA cycle: The cleaning cycle that begins with HEPA vacuuming, followed by a wet wash with a lead cleaning agent, such as trisodium phosphate detergent or another liquid cleaning agent, followed by a final pass with a HEPA vacuum over the surface.
48. High-Efficiency Particulate Air (HEPA) filter: A filter capable of removing particles of 0.3 microns or larger from air at 99.97 percent or greater efficiency.
49. Industrial hygienist: A person having, or currently obtaining a college or university degree in engineering, chemistry, physics, medicine, or a related physical or biological science who, by virtue of special training is qualified to anticipate, recognize, evaluate, and control environmental and occupational hazards for the community and workers, or an environmental technician who maintains certifications and/or have extensive experience in environmental sampling and remediation of a broad range of remediation activities.

50. Inspection (of paint): A surface - by - surface investigation to determine the presence of lead-based paint (in some cases including dust and soil sampling) and a report of the results.
51. Inspector: An individual who has completed training from an accredited program and been licensed or certified by the appropriate State and Local agency to (1) perform inspections to determine and report the presence of lead-based paint on a surface-by-surface basis through onsite testing, (2) report the findings of such an inspection, (3) collect environmental samples for laboratory analysis, (4) perform clearance testing, and (5) document successful compliance with lead-based paint hazard control requirements or standards.
52. Interior work area: means a hallway, room or group of rooms in which abatement takes place on the inside of a building.
53. Investigation (pertaining to EEL case): The process of determining the source of lead exposure for a child or other resident with an elevated blood lead level. Investigation consists of a questionnaire, comprehensive environmental sampling, case management, and other measures.
54. Laboratory analysis: A determination of the lead content by atomic absorption spectroscopy, inductively coupled plasma emission spectroscopy, or laboratory-based K or L x-ray fluorescence, or an equivalent method.
55. Landfill: A State-licensed or State-permitted disposal facility that meets municipal solid waste standards. (See Federal regulations at 40 CFR 258).
56. Lead: Lead includes metallic lead and inorganic and organic compounds of lead.
57. Lead-based paint: Any paint, varnish, shellac, or coating that contains lead equal to or greater than 1.0 mg/cm² s measured by XRF or laboratory analysis, or 0.5 percent by weight (5000 ug/g, 5000 mg/kg) as measured by laboratory analysis. (Local definitions may vary).
58. Lead-based paint hazard: A condition in which exposure to lead from lead-contaminated dust, lead-contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health (as established by the EPA Administrator under Title IV of the Toxic Substances Control Act). Lead-based paint hazards include for example, deteriorated lead-based paint, leaded dust levels above applicable standards, and bare leaded soil above applicable standards.
59. Lead-contaminated dust: Surface dust that contains an area or mass concentration of lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substance Control Act. Until the EPA standards are set, the HUD recommended clearance and risk assessment standards for leaded dust are 100 ug/sq. Ft. on floors, 500 ug/ sq ft on interior window sills, and 800 ug/sq ft on window troughs.
60. Lead-contaminated soil: Bare soil that contains lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substances Control Act. The HUD recommended standard and interim EPA guidance is 400 ug/g in other bare areas of the yard. Soil contaminate with lead at levels greater than or equal to 5000 ug/g should be abated by removal or paving.
61. Lead-specific detergent: A cleaning agent manufactured specifically for cleaning and removing leaded dust or other lead contamination.

62. Lead zinc: A paint primer made from zinc oxide and lead sulfates.
63. Licensed: Holding a valid license or certification issued by EPA or by an EPA approved State program pursuant to Title IV of the Toxic Substances Control Act. The license is based on certification for lead-based paint hazard control work.
64. Listed waste: A hazardous waste that has been placed on one of three list developed by EPA: nonspecific source wastes, specific source wastes, and commercial chemical products. The lists were developed by examining different types of waste and chemical products to determine if they exhibited one of the four characteristics of hazardous waste (toxicity, corrosivity, ignitability, or reactivity), meet the statutory definition of hazardous waste, were acutely hazardous, or were otherwise toxic.
65. Manifest: The shipping document (EPA Form 8700-22 or a comparable form required by the State or locality) used for identifying the quantity, composition, origin routings and destination of hazardous waste during its transport from the point of generation to the point of treatment, storage, or disposal. Also, a shipping document used to keep track of items being transported. All hazardous waste must be accompanied by manifest. See Hazardous waste.
66. Medical removal: The temporary removal of workers from the job because of the occurrence of elevated blood lead levels as defined in the OSHA Lead Exposure in Construction standard (29 CFR 1926.62).
67. Method detection limit (MDL): The minimum concentration of an analyte that, for a given matrix and method, has a 99 percent probability of being identified, qualitatively or quantitatively measured, and reported to be greater than zero.
68. NOTE: When ever a conflict exists between one of the above referenced definitions and that from any other applicable regulation, or source, the most stringent shall apply. The owner or owner's agent must approve the final interpretation.

1.2 SCOPE OF WORK

A. Description

1. Remove and dispose of all lead containing materials before they are disturbed by the proposed scope of work.
2. The Scope of Work covered by these specifications consists of lead containing materials abatement activities (i.e. disturbance, on site removal, encapsulation and off site disposal) of lead containing materials identified with an actionable level (greater than or equal to 1.0 mg/cm²) of lead from various building components of the school building. The scope of work under this abatement contract will include only the components with actionable levels of lead (greater than or equal to 1.0 mg/cm²) which will be impacted by the proposed work, or that have been identified by the school district as a potential lead hazard.
3. This abatement plan has been prepared in accordance with the requirements of the New York State Department of Education utilizing the guidelines established by HUD in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. These specifications are not intended and/or prepared for OSHA compliance with lead based paint and/or lead dust exposure. It should be assumed that the other painted surfaces that are to be impacted by the proposed work contain lead concentrations that did

not exceed the above referenced action level.

4. The scope of work for this project includes performance of interim control methods in accordance with these specifications, and the above referenced guidelines, on all confirmed and suspect lead containing materials to be impacted by the proposed work, as indicated in the following table:

Table 1.1		
Lead Containing Materials		
Capital Improvement Project		
S.S. Seward Institute MS/HS		
SED #: 44-21-15-02-0-001		
Note	Location	Lead Containing Materials
	Boys Locker Room	Ceramic Wall Tile (Beige)
	Workout Room	Cinderblock Wall (White)
	Room 105	Metal Cove Base (Blue)

5. Address lead containing building components that are to be impacted by the proposed work in accordance with the procedures and guidelines of these specifications, HUDs document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* and all applicable federal, state and local regulatory agencies having jurisdiction of the work being performed.
6. All lead containing materials abatement work shall be performed in accordance with the applicable provisions of OSHA and all other applicable federal, state and local laws, rules and regulations having jurisdiction over this project and includes all aspects of worker safety & protection. All other materials located in the abatement area that are not subject for removal shall be pre-cleaned and protected during the abatement in accordance with these specifications and HUD in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.
7. The lead abatement contractor is responsible for coordinating his work with the other contractors on site so that the building will be protected against any damage (ie. security, weather, etc.) and all work is completed in a timely fashion.

B. Personnel

- 1 Contractors performing containing materials abatement work that is being performed on surfaces containing lead based paint that are impacted as a result of reconstruction work, are not required to be EPA trained and certified. However, any work which is being performed strictly for the removal of lead based paint containing surfaces and lead contaminate dust and soil is considered an "EPA abatement project" as defined by the EPA and must comply fully with the EPA Regulations 40 CFR Part 745, including the requirements for EPA training and certified workers.

2. Also all workers performing work who may be occupationally exposed to lead must comply with OSHA Regulations, which includes safety training and education. The non "EPA abatement project" work still require the preparation, removal and disposal of lead based painted building components and shall be carried out by persons trained, qualified and certified in the techniques of abatement and subsequent cleaning, testing and disposal in compliance with all federal, state and local regulations. Workers performing reconstruction lead based paint abatement work are required to have proof of abatement experience (such as a current NYS DOL Handlers Certificate) or proof of training as follows:
3. The Contractor shall provide training for all employees or agents who may be required to disturb lead contaminated materials for abatement and auxiliary purposes and for all supervisory personnel who may be involved in planning, execution or inspection of abatement projects. Training shall provide, at a minimum, information on the following topics.
 - a. The health hazards of lead including the nature of various lead related diseases, routes of exposure, known dose-response relationships, the synergistic relationship between lead exposure, latency periods for disease and health basis for standards.
 - b. Employee personal protective equipment including the types and characteristic of respirators, field testing the face- piece-to face seal (positive and negative pressure fitting tests), qualitative and quantitative fit testing procedures, variations between laboratory and field fit factors, factors that affect respirator fit (e.g. facial hair), selection and use of disposable clothing, use and handling of launderable clothing, non-skid shoes, gloves, eye protection and hard hats.
 - c. Medical monitoring requirements for workers including required and recommended tests, reasons for medical monitoring and employee access to records.
 - d. Air monitoring procedures and requirements for workers including description of equipment and procedures, reasons for monitoring, types of samples and current standards with recommended changes.
 - e. Work practices for lead abatement including purpose, proper construction and maintenance of air-tight plastic barriers, job set-up of air locks, worker decontamination systems and waste transfer air locks, posting of warning signs, engineering controls, electrical and ventilation system lockout, proper working techniques, waste clean-up, storage and disposal procedures.
 - f. Personal hygiene including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking, chewing and contact lenses in the work area.
 - g. Special safety hazards that may be encountered including electrical hazards, air contaminants (CO, wetting agents, encapsulant, materials from Owner or Owner's Agent operation), fire and explosion hazards, scaffold and ladder hazards, slippery surfaces, confined spaces, heat stress and noise.
 - h. Workshops affording both supervisory personnel and abatement workers the opportunity to see (and experience) the construction of containment barriers and decontamination facilities.

4. Training is to have occurred within 12 months prior to the initiation of abatement activities.
5. Contractor must document training by providing date of training, training entity, duration of the training, course outline, and names and qualifications of trainers.
6. The contractor shall also show for each individual who is performing the abatement work, proof of respiratory training, medical examination and respirator fit testing in strict accordance with the most recent regulations having jurisdiction. In addition the contractor must also provide proof of a company respiratory protection plan in accordance with OSHA.

C. Restoration

1. The contractor is responsible for the cleaning and removal of all debris located in the work area and surrounding areas after the abatement has been completed. Any damages caused during the performance of abatement activities shall be repaired by the Contractor (ex. Paint peeled off by barrier tape, nail holes, water damage, broken glass, damaged vegetation) at no additional expense to the building owner.
2. The contractor is responsible for restoring abatement surfaces to conditions acceptable to the restoration contractor, building owner and owner's representative. This shall include, but is not limited to lingering odors or out gassing from chemical methods of abatement, damage to substrates (ex. flooring, roof decking, etc.) caused by abatement techniques and any other surface or subsurface damaged caused by the abatement technique. The contractor is responsible for the cleaning and removal of all debris located in the work area and surrounding areas after the abatement has been completed.

1.3 PERFORMANCE OF WORK

The contractor is required to perform the scope of work in the following sequence and in accordance to the special requirements. Whenever there is a conflict between this schedule and requirements of any applicable regulations the most stringent shall apply.

A. Preparation

1. The owner shall be responsible to remove all moveable objects from the work area prior to the start of abatement activities.
2. The contractor shall submit in writing for approval by the building owner or owner's agent all specific building component replacement items, proposed methods of abatement, demolition or remediation methods, enclosure materials, paint removal equipment and/or chemicals, tools, and cleaning supplies.
3. The contractor is responsible for obtaining any necessary or required building or waste permits; notify local authorities if the local jurisdiction requires it. Also notify occupants of the structure and adjacent structures of the work area and the date when it will begin.
4. The contractor, the building owner and/or owner's agent shall conduct a pre-construction conference to ensure the contractor fully understands the work involved and that all submittal have been received and approved.

5. The contractor shall then proceed as follows:
 - a. The contractor will inspect the work area, and all areas utilized throughout the project for any unsafe situations or dangerous conditions prior to the beginning of the project. The contractor will then be responsible to take appropriate actions and steps to effectively provide a safe environment for his workers.
 - b. The contractor shall then inspect the work area and all other areas that will be utilized throughout the abatement project for any property and/or objects damage that may exist prior to the beginning of the work. This information must be submitted to the owner or owner's agent prior to the start of any work. The contractor will be responsible for obtaining written confirmation of the owner or owner's agent receipt of the submittal. The contractor will be responsible for the repair and/or replacement of any damaged materials and/or objects inside the work area or in the areas utilized by the contractor during the abatement project that were not noted and acknowledged by the owner or owner's agent.
 - c. The contractor shall then construct decontamination units as required by these specifications and all applicable regulations. The decontamination units shall be constructed with a plywood, or equal, covering (exterior).
 - d. The contractor shall then construct isolation barriers as required by these specifications and all applicable regulations.
 - e. All areas in which no abatement is to take place will be sealed shut or otherwise isolated from the work area as required by these specifications and all applicable regulations.
 - f. Removal of lead shall not commence until the decontamination units and work areas have been inspected and approved by the owner or owner's agent.

B. Abatement

1. The removal of the lead based painted building components will be performed as required by these specifications in accordance with OSHA, HUD in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* and all other applicable federal, state and local laws, rules and regulations having jurisdiction over the work being performed and includes all aspects of worker safety & protection.
2. After the work area has been rendered free of all visible residues, the contractor shall request a visual inspection of from the owner or owner's agent. It is then the owner or owner's agent discretion whether the work area has been rendered free of all lead based hazards. The owner reserves the right to have bulk and/or wipe sampling performed in the work area to ensure that sufficient removal and cleaning was performed.

C. Clearance

1. Clearance testing shall include dust wipe sampling and/or soil sampling where applicable. Clearance sampling protocols and testing results will be performed and evaluated in accordance with HUD criteria as indicated in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* as summarized below:

Lead Based Paint Abatement Clearance Criteria	
Bare & Carpeted Floors	10 ug/ft2
Interior Window Sills	100 ug/ft2

D. Special Requirements

1. The Contractor shall become familiar with special conditions at the site, which must be considered during the lead abatement. These conditions include but are not limited to:
 - a. The Contractor shall be responsible for providing emergency power and lighting to the work area in case of electrical failure, as needed; all power to work areas shall be brought in from outside the work area through a ground fault circuit interrupter at the source. The owner reserves the right to have this electrical system approved by a state licensed electrician.
 - b. Contractor must provide a qualified worker to be stationed at the work area entrance to control entry into the work area. This worker must be present at all times while the abatement is in progress.
 - c. The contractor shall record results of smoke tests of all critical and isolation barriers, at the beginning and end of each shift. Contractor shall designate an individual just for this purpose (if applicable).
 - d. There must be a daily pre-construction meeting between the contractor and the owner or owner's agent to schedule the detail of work and work areas for each shift in advance.
 - e. A first aid kit must be provided by the Contractor on the premises, sized to correspond to the number of workers present.
 - f. The Contractor is responsible for enforcing personal air monitoring of the abatement workers as required. The contractor is also responsible for ensuring that only experienced workers are located within the work area and that they are wearing required respiratory and protective clothing and gear.
 - g. The contractor must supply the owner's agent with a waste manifest for all lead or lead contaminated waste removed from the site.
 - h. It shall be the contractor's sole responsibility to implement and enforce all relevant OSHA regulations having jurisdiction of the abatement work.
 - i. The contractor may not store any lead related waste materials, whether lead waste or construction waste, or construction tools or materials in the work area. The work area must be cleaned and cleared at the end of each shift.
 - j. The contractor is required to supply the owner and owner's agents with required respiratory and protective clothing whenever the owner and/or owner's agent desires to enter the work area.

- k. All disposals of waste materials will be performed in accordance with all applicable federal, state and local laws, rules and regulations. This includes the proper removal and disposal of all hazardous and regulated waste generated in conjunction with the abatement and any demolition work.
- l. The contractor will be responsible for the security of the work area and the storage of lead contaminated waste until its removal from the site. This includes any access into the building.
- m. The contractor will be responsible for the cross contamination of lead dust or suspect lead debris to non-work areas or areas utilized during the abatement project. In the event that a non-work area is suspect of having been contaminated the contractor is responsible for the proper cleaning and clearance of these areas. It will be the owner or owner's agent's discretion that these areas have been sufficiently cleaned based upon their visual inspection and/or clearance sampling. This includes, but is not limited to, debris falling in public areas, air plenums and other spaces.
- n. The contractor will be responsible for reimbursement to the owner for any additional costs incurred as a result of the cross contamination.

1.4 APPLICABLE STANDARDS AND GUIDELINES

- A. All work under this contract shall be done in strict accordance with these specifications and in accordance with OSHA, HUD in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* and all other applicable federal, state and local laws, rules and regulations having jurisdiction over the work being performed and includes all aspects of worker safety & protection, including, but not limited to the following:
 - 1. New York State Department of Environmental Conservation 6NYRR Subparts 371-376 Code of Federal Regulations (CFR) Publications:
 - a. 29 CFR Part 1926.62 Lead Exposure in Construction; Final Rule Vol. 58, No. 84
 - b. 40 CFR 61 Subpart A General Provisions (Hazardous Air Pollutants Listing)
 - c. 40 CFR 61.152 Standard for waste Manufacturing, Demolition, Renovation, Spraying and Fabricating Operations
 - d. 40 CFR 241 Guidelines for the Land Disposal of Solid Waste
 - e. 40 CFR 257 Criteria for Classification of Solid Waste
 - f. 40 CFR 261 & 262 waste Disposal Facilities & Practices
 - g. American National Standards Institute ANSI Publications
 - h. Z88.22-80 Practices for Respiratory Protection
 - i. Z87.1 Eye Protection

2. National Institute of Occupational safety & Health (NIOSH) Publications:
 - a. Manual of Analytical Methods, 2nd Edition, Volume 1, Physical & Chemical Analysis Method (P&CAM)
3. The most recent edition of any relevant regulation, standard, document or codes shall be in effect. Where conflict among the requirements or with these specifications exists the most stringent requirements shall be utilized.
4. Copies of all standards, regulations, codes and other applicable documents, including this specification shall be available at the worksite in the clean change area of the worker decontamination system. The Contractor will supply these documents.

1.5 SUBMITTAL AND NOTICES

The following items shall be submitted to the Architect for review ten (10) days prior to the commencement of work associated with this section of the specifications. No work shall begin until all submittal are received and approved.

A Contractor shall prior to Commencement of Work:

1. The contractor shall submit in writing for approval by the building owner or owners agent all specific building component replacement items, proposed methods of abatement, demolition or remediation methods, enclosure materials, paint removal equipment and/or chemicals, tools, and cleaning supplies. The proposed method of abatement should include a detailed explanation of the plan to abate the lead based paint.
2. The contractor is responsible for obtaining any necessary or required building or waste permits; notify local authorities if the local jurisdiction requires it. Also notify occupants of the structure and adjacent structures of the work area and the date when it will begin.
3. In addition, all other notifications required by federal, state or local laws and regulations, will be made by the contractor within the required time period. The contractor shall submit proof that all required permits and notifications have been submitted and received.

B. At the owner or owners agents request the contractor shall provide the following:

1. Submit all documentation satisfactory to the Building Owner or Owner's Agent that the Contractor's employees, including foremen, supervisors and any other company personnel or agents who may be exposed to airborne lead dust or who may be responsible for any aspects of abatement activities, have received adequate training in accordance with these specifications.
2. Submit documentation from a physician that all employees or agents who may be exposed to airborne lead in excess of background level have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. In addition, document that personnel have received medical monitoring as required in OSHA 29 CFR . The Contractor must be aware of and provide information to the examining physician about unusual conditions in the workplace environment (e.g., high temperature, humidity, chemical contaminants) that may impact on the employees' ability to perform work activities.

3. Submit documentation of respirator fit testing for all Contractor employees and agents who must enter the work area. This fit testing shall be in accordance with qualitative procedures as detailed in the OSHA Safety & Health Standards 29 CFR.
4. Name and address of the proposed monitoring testing laboratory and a written description of the proposed method of measuring air samples.

C. During Abatement Activities:

1. Prepare daily job progress reports detailing abatement activities. Include review of progress major problems and actions taken, injury reports, equipment breakdown, etc.
2. Prepare copies of all transport manifests, trip tickets and disposal receipts for all lead waste materials removed from the work area during the abatement process.
3. Prepare daily, copies of worksite entry logbooks with information on worker and visitor access.
4. Prepare daily logs documenting filter changes on respirators, HEPA vacuums, negative pressure ventilation units, and other engineering controls if required.
5. Prepare results of air sampling data collected during the course of the abatement for OSHA compliance air monitoring.
6. Prepare and have available upon request, results of any lead sampling & analysis data that is collected during the course of the abatement.

1.6 SITE SECURITY

1. The work area is to be restricted only to authorized, trained, and protected personnel. These may include the Contractor's employees, Owner or Owner's Agent employees and representatives, state and local inspectors and any other designated individuals. A list of authorized personnel shall be established prior to job start and be posted in the clean room area.
2. Entry into the work area by unauthorized individuals shall be reported immediately to the Building Owner or Owner's Agent by the Contractor.
3. A logbook shall be maintained in the clean-room area of the decontamination facility. Anyone who enters the work area must record name, affiliation, time in, and time out for each entry.
4. Contractor shall have control of site security during abatement operations whenever possible, in order to protect work efforts and equipment.

1.7 EMERGENCY PLANNING

1. The Contractor shall develop emergency planning prior to abatement initiation.

2. Emergency procedures shall be in written form and prominently posted in the clean room area and equipment room of the worker decontamination area. Prior to entering the work area, everyone must read and sign these procedures to acknowledge receipt and understanding of work site layout, the location of emergency exits and emergency procedures.
3. Emergency planning shall include considerations of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. The Contractor shall develop written procedures and Contractor's employees shall be trained in emergency procedures. Upon completion of training, the employee will sign a document indicating full understanding of the procedures.
4. Employees shall be trained in evacuation procedures in the event of workplace emergencies.
5. For life threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove him/her from the workplace and secure proper medical treatment.
6. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room area and equipment room, along with the location of the nearest telephone.

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PART 2 - MATERIALS

2.1 MATERIALS

Whenever a conflict exists between one of the following statements and that from any other applicable regulation or source the most stringent shall apply. The owner or owner's agent must approve the final interpretation.

A. General

1. Deliver all materials in the original packages, containers or bundles bearing the name of the manufacturer and the brand name (where applicable).
2. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the work area until abatement is completed. No waste may be stored in the work area overnight. All waste must be removed at the end of each shift.
3. Areas utilized outside the work area used for storage must be maintained in a neat and safe manner.
4. Disposal bags shall be of 6-mil polyethylene, pre- printed with labels as required by EPA, OSHA and Department of Transportation regulations.

B Removal

1. Surfactant (wetting agent) shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by manufacturer. (An equivalent surfactant shall be understood to mean a material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM approved methods. Where work area temperature may cause freezing of the amended water solution, the addition of ethylene glycol in amounts sufficient to prevent freezing is permitted.
2. Glove bags shall be a minimum 6 mil. thick clear poly bags with permanently attached arms with latex gloves specially designed for removing lead-containing material from pipes.
3. Encapsulating agent is not to be applied to surfaces from which lead containing material has been stripped.

2.2 EQUIPMENT

A. General

1. A sufficient number of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI and EPA guidance documents.
2. Full body disposable protective clothing, including head, body and foot coverings consisting of material impenetrable by lead dust (Tyvek R or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

3. Additional safety equipment (e.g., hard hats meeting the requirements of ANSI Standard Z89.1- 1981, eye protection meeting the requirements of ANSI Standard Z87.1-1979, safety shoes meeting the requirements of ANSI Standard Z41.1-1967, disposable PVC gloves necessary, shall be provided to all workers and authorized visitors.

B Removal

1. A sufficient supply of scaffolds, ladders, lifts and hand tools (e.g., scrapers, wire cutters, brushes, utility knives, wire saws, etc.) shall be provided as needed.
2. Sprayers with pumps capable of providing 500 pounds per square inch (psi) at the nozzle tip at a flow rate of 2 gallons per minute for spraying amended water.
3. Rubber dustpans and rubber squeegees shall be provided for cleanup.
4. Brushes utilized for removing loose lead containing material shall have nylon or fiber bristles, not metal.
5. A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

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PART 3 - METHODOLOGY

Whenever a conflict exists between one of the following statements and that of from any other applicable regulation or source the most stringent shall apply. The owner or owner's agent must approve the final interpretation.

3.1 WORKER & EMPLOYEE PERSONNEL PROTECTION REQUIREMENTS

A. Training

1. Prior to commencement of abatement activities all personnel who will be required to enter the work area or handle containerized lead containing materials must have received adequate training and certification. Special on-site training on equipment and procedures unique to this job site shall be performed as required. Training in emergency response and evacuation procedures shall be provided.

B. Respiratory Protection

1. Respiratory protection shall be provided to workers in accordance with OSHA and the submitted written respiratory protection program which shall meet the requirements of the most recent regulations having jurisdiction over respiratory protection.

C. Testing

1. Workers must perform positive and negative air pressure fit tests each time a respirator is put on, whenever the respirator design so permits. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer. All other testing of respiratory protection devices shall be performed in strict accordance with the most recent regulations having jurisdiction over respiratory protection.

D. Protective Clothing

1. Disposable clothing including head, foot and full body protection shall be provided in sufficient quantities and adequate sizes for all workers and authorized visitors and shall be worn in strict accordance with the most recent regulations having jurisdiction over protective clothing.

E. Personal Monitoring

1. Sampling shall be conducted in strict accordance with the most recent regulations having jurisdiction over personal monitoring.

3.2 MEDICAL MONITORING

- A. Medical Monitoring must be provided by the Contractor to any employee or agent that may be exposed to lead in excess of background levels during any phase of the abatement project in strict accordance with the most recent regulations having jurisdiction over employee medical monitoring.

3.3 WORK AREA PREPARATION

A. General

1. The contractor shall submit in writing for approval by the building owner or owner=s agent all specific building component replacement items, proposed methods of abatement, demolition or remediation methods, enclosure materials, paint removal equipment and/or chemicals, tools, and cleaning supplies.
2. The contractor is responsible for obtaining any necessary or required building or waste permits; notify local authorities if the local jurisdiction requires it. Also notify occupants of the structure and adjacent structures of the work area and the date when it will begin.
3. The contractor, the building owner and/or owner=s agent shall conduct a pre-construction conference to ensure the contractor fully understands the work involved and that all submittal have been received and approved.
4. The Contractor shall post caution signs meeting the specifications of OSHA 29 CFR 1910.1001 (j) (1) (ii) at any location and approaches to a location where airborne concentrations of lead may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers.
5. The Contractor shall ensure that HVAC Systems are shut down and seal all intakes and exhaust vents in the work area with duct tape and 6-mil polyethylene. Also seal any seams in system components that pass through the work area. Remove all HVAC system filters and place in labeled 6-mil polyethylene bags for staging and eventual disposal as lead contaminated waste.
6. The Contractor shall seal off all windows, doorways, elevator openings, corridor entrances, drains, ducts, grills, grates, diffusers, skylights and any other openings between the work area and uncontaminated areas outside of the work area (including the outside of the building, tunnels and crawl spaces) with 6-mil polyethylene sheeting and duct tape.
7. The Contractor shall Pre-clean contaminated moveable objects within the work area using a HEPA filtered Vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the work area.
8. The Contractor shall Pre-clean all fixed objects in the work area.
9. The Contractor shall Pre-clean all surfaces in the work area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb lead containing materials during the pre-cleaning phase.
10. Prepare the hazardous building component for removal. Turn off and disconnect any electrical circuits inside or near the building component to be removed. All electrical circuits shall be locked and tagged in accordance with all applicable regulations.

11. The contractor must construct a worker, waste and equipment decontamination system. The decontamination systems shall be provided at all locations where workers will enter or exit the work area. The worker decontamination system shall be constructed as to provide an adequate procedure to successfully decontaminate the worker, equipment and all waste generated as to avoid the cross contamination of the non-work areas. A proposed decontamination system design must be submitted by the contractor and approved by the owner of owner's agent.
12. One layer of fire retardant plastic shall be placed on the ground extending 25 feet beyond the perimeter of working surfaces. Do not anchor ladder feet on top of plastic (puncture the plastic to anchor ladders securely to ground). For all other exterior plastic surfaces, protect plastic with boards to prevent puncture from falling debris, nails, etc., if necessary. Raise edges of plastic to create a basin to prevent contaminated runoff in the event of unexpected precipitation. Secure plastic to side of building with tape or other anchoring system (no gaps between plastic and building). Weight all plastic sheets down with two-by-fours or similar objects. Keep all windows within 25 feet of working surfaces closed. For exterior abatement projects the contractor is responsible for placing the plastic in such a fashion that they do not damage or kill any vegetation. Any damage caused to the surrounding vegetation will be the responsibility of the contractor.
13. Plastic shall be sized to minimize seams. If the floor area necessitates seams, those on successive layers of sheeting shall be staggered to reduce the potential for water to penetrate to the underlying soils or paved surfaces. A distance of at least 6 feet between seams is sufficient. Floor sheeting, if utilized shall extend at least 16 inches up the sidewalls of the work area, and fasten securely to the wall. Sheeting shall be installed in a fashion so as to prevent slippage between successive layers of material. (Vinyl sheeting may be used for improved traction on floors).

B. Exterior Abatement Projects

1. The owner and/or owner's agent will collect pre abatement soil samples, which may not have to be analyzed until post abatement soil samples have been collected, analyzed, and compared to clearance standards. If post abatement soil levels are below applicable limits, the pre abatement samples need not be analyzed.
2. The contractor must erect temporary fencing or warning barrier tape at a 25-foot perimeter around working surfaces (or less if distance to next building is less than 25 feet). If an entryway is within 25 feet of working surfaces require use of alternative entryway. If practical install a vertical containment to prevent exposure. Use a locked dumpster, covered truck, or locked dumpster, covered truck, or locked room to store debris before disposal.
3. In the instances when playground equipment, toys, sandboxes, etc. are within the work environment the contractor shall remove all movable items to a 25-foot distance from working surfaces. Items that cannot be readily moved to 25-foot distance can be sealed with taped plastic sheeting.

3.4 REMOVAL

- A. Wet all lead paint containing surfaces with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne dust concentrations when the material is disturbed (unless electrical circuits are nearby).

- B. Saturate the material to the substrate; however, do not allow excessive water to accumulate in the work area. Keep all removed material wet enough to prevent dust release until it can be containerized for disposal. Maintain a high humidity in the work area by misting or spraying to assist in dust settling and reduce airborne concentrations.
- C. Using a utility knife or other sharp instrument, carefully score all affected painted seams. This will provide space for a pry instrument and will minimize paint chipping and dust generation during removal.
- D. Remove any screws or other fasteners. Using a flat pry instrument and a hammer, carefully pry the affected building component away from the surface to which it is attached. The pry bar should be inserted into the seam at the nail (or other fastening device) at one end of the component and pressure applied. This process should be repeated at other fastening locations until the end of the component is reached. By prying in this manner, the component will be removed intact and chip and dust generation will be minimized. A pry point pad or softener may be required to minimize damage to adjoining substrates. Wider replacement trim can sometimes be used to cover adjacent area damage. When the entire structure is to be demolished, the demolition should be performed in such a manner as to minimize the release of dust.
- E. Wrap and seal bulk components in plastic and take them to covered truck or secured waste storage area along pathways covered with plastic.
- F. Mist and then shovel any debris. HEPA vacuum any dust or chips in the area where the component was located. Using an airless spray, lightly mist the component to be removed with water to help keep the dust down during the removal process. Before applying the water, be sure there are no electrical circuits inside the component. (If electrical circuits are present inside the component, they must be turned off and disconnected before removal). Since there is often a considerable amount of leaded dust underneath or behind the component being removed, begin cleanup immediately after the individual component has been removed.
- G. Carefully remove or bend back all nails (or other fastening devices) and wrap the component in 6-mil plastic sheeting and seal with duct tape. Wrapping components in plastic may not be necessary if the work area and surrounding areas are vacant and if the truck and the pathway to the truck are lined with plastic. Use a high-efficiency particulate air (HEPA) vacuum to remove any dust that may have accumulated behind the components as soon as they have been removed. Dispose of wrapped components properly.
- E. Conduct ongoing cleaning during the job, including regular removal of large and small debris and dust. Decontamination of all tools, equipment, and worker protection gear is required before it leaves containment areas. Electrical equipment should be wiped and high-efficiency particulate air (HEPA) vacuumed, not wetted down, to minimize electrocution hazards.
- F. Schedule sufficient time (usually 30 minutes to an hour) for a complete daily cleaning, starting at the same time near the end of each workday after lead hazard control activity has ceased.
- G. Do not conduct work if wind speeds are greater than 20 miles per hour. Work must stop and cleanup must occur before rain begins.
- H. Do not leave debris or plastic out overnight if work is not completed. Keep all debris in secured area until final disposal.

- I. Correct any existing conditions that could impede the abatement work (e.g. trash removal, structural deficiencies).
- J. Store all waste in a secure area and make sure it is properly labeled with an accumulation start date

3.5 CLEAN UP PROCEDURES

- A. The contractor is responsible for having sufficient cleaning equipment and supplies before beginning final cleaning work. For final cleaning, wait at least 1 hour after active lead hazard control activity has ceased to let dust particles settle.
- B. Remove and containerize all visible accumulation of lead paint containing materials and lead waste contaminated debris utilizing rubber dust pans and rubber squeegees to move material around. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to floor sheeting.
- C. Wet clean all surfaces in the work area using rags, mops and sponges as appropriate. (Note: Some HEPA vacuums might not be wet-dry vacuums. To pick up excess water and gross wet debris, a wet-dry shop vacuum may be used. This will be contaminated and require cleaning prior to removal from the work area).
- D. Decontaminate all tools and equipment and remove at an appropriate time in the cleaning sequence.
- E. Use a vacuum cleaner equipped with a HEPA exhaust filter. HEPA vacuum all surfaces in the room (ceilings, walls, trim, and floors). Start furthest from the exit a work down moving toward the entry door. Completely clean each room before moving on.
- F. The work area shall be cleaned until it is in compliance with Federal, State and Local requirements and no visible residue is observed.
- G. Have an independent; certified inspector technician or risk assessor conduct a clearance examination after waiting at least 1 hour after cleanup has been completed to let dust settle.
- H. If clearance is not achieved, repeat cleaning and/or complete abatement work. Repeat clearance examination and, if clearance is achieved, obtain any required formal release or certificate of completion required by the U.S. Department of Housing and Urban Development (HUD) or local authorities.
 - I. Conduct clearance and re-clean if necessary.
 - J. Following the satisfactory completion of clearance air monitoring, remaining barriers may be removed and properly disposed of. A final visual inspection shall insure that no contamination remains in the work area. Unsatisfactory conditions may require additional cleaning and air monitoring.

3.6 CLEARANCE

- A. Clearance testing shall include dust wipe sampling and/or soil sampling where applicable. Clearance sampling protocols and testing results will be performed and evaluated in accordance with HUD criteria as indicated in their document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* as summarized below:

Lead Based Paint Abatement Clearance Criteria	
Bare & Carpeted Floors	10 ug/ft2
Interior Window Sills	100 ug/ft2

3.7 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS

- A. Re-establishment of the work area shall only occur following the completion of clean-up procedures and after clearance air monitoring has been performed and documented to the satisfaction of the Building Owner or Owner's Agent.
- B. Polyethylene barriers shall be removed from walls and floors at this time, maintaining decontamination enclosure systems and barriers over doors, windows, etc. as required.

3.8 WASTE DISPOSAL

- A. All waste generated as part of the abatement project must be sampled and analyzed to determine its RCRA Toxicity Characteristic. All sampling, analysis and waste characterization must be performed in accordance with RCRA.
- B. Based upon the results of the RCRA TCLP analysis the waste shall be disposed of in accordance with all applicable federal, state and local regulations.

3.9 WASTE STORAGE

- A. While architectural components may or may not be regulated as hazardous waste, they still must be properly managed. All building components coated with lead-based paint should be stored in a secure, locked area. They should not be sold or released to anyone who might reinstall them in other dwelling.
- B. Building component replacement and demolition generate a considerable amount of waste material. Lead-contaminated building components and demolition debris should be handled carefully, even if they are not regulated as hazardous wastes. Bulk debris such as doors, windows, and trim should be wrapped in 6-mil plastic and sealed with tape. Smaller debris should be swept into 6-mil plastic bags after spraying.
- C. All debris should be removed from the site as soon as possible. In larger jobs where a dumpster is being used, it may be possible to eliminate the wrapping and bagging of bulk debris as long as the dumpster has a lockable lid and is lined with plastic and secured with a fence and signs. Pathways to the dumpster should be lined with plastic so as not to contaminate the area.
- D. Contaminated building components and demolition debris should be transported in covered vehicles to an appropriate disposal facility. Old building components coated with lead-based paint must not be recycled.

3.10 TRANSPORTATION PROCEDURES

- A. Transportation and disposal of lead or lead contaminated materials must be performed in strict accordance with the most recent regulations having jurisdiction over the transportation of lead or lead contaminated waste. All dump receipts, trip tickets, transportation manifests or other documentation

of disposal shall be delivered to the Building Owner or Owner's Agent for his records.

3.11 LEAD ABATEMENT MONITOR

- A. The owner will be responsible for retaining the services of an independent third party industrial hygienist to monitor the contractor's activities in accordance with these specifications. However the review of the contractor's submittal, pre-project meetings, and the final clearance of the abatement project and preparation of the project close out package must be performed by an EPA Certified Lead Inspector and Risk Assessor.

3.12 LABORATORY SERVICES

- A. The owner shall be responsible for retaining the services of an independent testing laboratory to perform and fulfill the sampling analysis requirements in accordance with these specifications and HUD.
- B. Laboratories utilized for analyzing air samples by NIOSH 7400 method shall be certified under the New York State Environmental Laboratory Approval Program (ELAP) Laboratories for lead or National Laboratory Approval Program (NLAP).

END OF SECTION 02090

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01700 - CONTRACT CLOSEOUT

CONTENTS

1. Scope
2. Punch List and Final Inspection
3. Operations and Maintenance Instructions
4. Project Closeout Documents
5. Emergency Repairs
6. Certificate of Substantial Completion
7. Contractor's Guarantee

1. SCOPE

Prior to the release of final accrued retainage monies, the Contractor shall comply with the procedures for closing out the Construction Contract and to effect the project's transition to the Owner as summarized herein below.

2. PUNCH LIST AND FINAL INSPECTION

a. Preparation of Punch List:

1. When the Contractor determines that the project is substantially complete, he shall prepare a "Punch List" of the last items to be completed or corrected and shall notify the Owner in writing through the Architect that the project will be ready for a final inspection on a definite date which shall be stated in such notice. Such notification shall be given at least ten (10) days prior to the date stated for final inspection.
2. It shall be noted here, and emphasized, that preparation of the "Punch List" is a responsibility of the Contractor and not the Architect. The Architect's sole role will be that of an observer to assure that the design intent is carried out, and as an administrator of the Construction Contract.
3. The Contractor's failure to include an item of deficiency on the punch list issued to the Contractor shall not relieve the Contractor of its responsibility to perform its work in accordance with the Drawings and/or Specifications, and as such, the punchlist may be revised, updated, and/or reissued at any time.

b. Review and Substantial Completion:

The Architect will review the Contractor's "Punch List" and on the basis of his inspection will verify the condition of substantial completion and prepare the Certificate of Substantial Completion, A.I.A. Document G704.

c. Completion and Final Inspection:

1. Written notice shall also be given to the Architect by the Contractor upon completion of any work which, on the above stated final inspection, was determined to be incomplete, incorrect, or unsatisfactory and not to the stage of substantial completion. On receipt of such notice, additional inspection(s) will be made until completion of all contract requirements are effected. If the Architect is required to inspect the Contractor's work more than twice, the Contractor shall be liable to the Owner for the services performed by the Architect as a result of additional inspections.
2. The final inspection is intended to be a last review to determine that the work included in the contract has indeed been executed in accordance with all of the Contract Documents. Requests to render a final inspection of an incomplete building or to prepare the Contractor's "Punch List" will not be honored.

3. OPERATIONS AND MAINTENANCE INSTRUCTIONS

- a. The Contractor shall start up, test, adjust, balance and otherwise place in a satisfactory working condition all items of mechanical and electrical systems, and shall fully instruct representatives of the Owner in the care and operation of such systems.
- b. Instruction of the Owner's Maintenance Supervisor in the proper methods of cleaning and maintaining all the finished surfaces and the proper methods of replacement of the consumable items such as filters, light bulbs, washers, etc., shall be a part of this work.

4. CONTRACT CLOSEOUT DOCUMENTS

- a. After Execution of Certificate of Substantial Completion, and prior to submittal of Final Application for Payments, the Contractor shall submit the following documents to the Architect:
 1. Contractor's notarized affidavit that all payrolls, bill and materials, equipment, and other indebtedness connected with the work have been paid.
 2. Notarized Certificates of Waiver of Liens for himself, each Subcontractor, each material supplier or person furnishing materials or services to the project.
 3. List of subcontractors and major material suppliers including address, telephone number, and name of individual to contact.
 4. Validated warranties and notarized copies of all guarantees for equipment and materials specifically called for in the Contract Documents.

5. Consent of Surety to Final Payment.
 6. Fire Underwriters Certification (where applicable).
 7. Conformed Construction Drawings (As-builts), per section 01720.
 8. Record copy of each shop drawing or installation diagram.
 9. Operating manual (three (3) sets) assembled and bound, each containing:
 - a. Explanatory brochures of all equipment.
 - b. Catalog cut.
 - c. Wiring diagrams.
 - d. Instruction sheets for operation and maintenance.
 10. Guarantees:
 - a. Standard guarantee as per attached form.
 - b. Additional specific guarantees required by Technical Section of Contract Documents.
 - c. Manufacturer's warranties together with list of all items of equipment of material carrying warranty.
- b. Package all items properly indexed and deliver to Architect for review and transmittal to Owner.

5. EMERGENCY REPAIRS

During a valid warranty period, if the Contractor is unable or unwilling to respond immediately to make emergency repairs under conditions which the Owner may determine to be an emergency situation, the Owner reserves the right, and the Contractor recognizes such right, to make such emergency repairs and then to bill the Contractor for a fair and reasonable amount in reimbursement for such repairs.

6. CERTIFICATE OF SUBSTANTIAL COMPLETION

Certificate of Substantial Completion, A.I.A. Document G704, is included herein for review by the Contractor. This document shall be executed in triplicate when the work is sufficiently complete to warrant issuance of this document by the Architect.

7. The following two pages are the Contractor's Guarantee and shall be submitted along with the required Closeout Documents.

7. CONTRACTOR'S GUARANTEE

CONTRACTOR'S NAME AND ADDRESS

OWNER'S NAME AND ADDRESS

PROJECT: _____

LOCATION: _____

CONTRACT FOR: _____

CONTRACT DATE: _____

The Contractor hereby guarantees that all Work performed and/or materials installed under the above referenced contract is of the quality that will comply with all specific requirements of the contract documents and hereby insures the Owner against all defects of material for two (2) years and workmanship for a period of two (2) years from and after the date of Final Payment. This does not waive stipulation of other clauses which specify guarantee periods in excess of the obligations herein.

It is further agreed that if, after due inspection, the Architect, as provided in the General Conditions of the Contract for Construction, shall decide that the replacement or repair of any of the Work is, in his opinion, necessary, such defective Work will be repaired or removed and replaced with New Work, meeting all requirements of the Contract Documents, same being done promptly and without expense to the Owner. Repairs and replacements are to include all costs of replacing or repairing other work damaged by the removal and replacements of the work covered by this guarantee and all costs necessary for restoring any portion of the building and its contents which are damaged due to defects in this Contractor's Work or materials.

The Contractor agrees to perform all corrective work necessary promptly upon receipt of written notification from the Owner unless the Owner has previously given the Contractor a written acceptance of such condition.

The Contractor stipulates and agrees that if he fails or neglects to carry out promptly the provisions of this guarantee or any part thereof, the Owner may cause all defects to be remedied and all repairs to be made without further notice to the Contractor and shall charge to and recover the expense thereof from the Contractor and/or Sureties.

Such decisions as the architect shall render in connection with this guarantee are subject to the provisions of the General Conditions.

CONTRACTOR:

CORPORATE SEAL:

BY: _____

DATED: _____

STATE OF NEW YORK, COUNTY OF _____ ss:

On the _____ day of _____, 20____, before me personally came

_____, to me known, who being by me duly sworn, did depose and say that he resides at _____

_____, that he is the _____ of _____, the corporation described in and which executed 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 said corporation, and that he signed his name thereto by like order.

STATE OF NEW YORK, COUNTY OF _____ ss:

On the _____ day of _____, 20____, before me personally came

_____, to me known, and known to me to be the individual described in, and who executed the foregoing instrument, and _____ acknowledged to me that _____ executed same.

NOTARY PUBLIC, State of New York

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01710 - FINAL CLEANING

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE:

- A. Each prime contractor shall at all times during the progress of the work keep the building and site free from accumulation of rubbish.
- B. Each prime contractor shall provide final cleaning of those areas of site and structure (exterior and interior) involved in the work of his respective contract immediately before final inspection.

1.02 PROTECTION AND CONTROL

- A. Fire Protection:
 - 1. Store volatile waste removed in final cleaning in covered metal containers, and remove from premises to comply with local and/or state ordinances and OSHA.
 - 2. Gasoline and fuel oil storage facilities shall be located and maintained in full compliance with local and/or state ordinances and OSHA.
- B. Pollution Control:
 - 1. Conduct clean up and disposal operations to comply with local ordinances and/or state ordinances and OSHA anti-pollution laws.
 - 2. Burning or burying of rubbish and waste materials on the project site is not permitted.
 - 3. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS:

- A. Use only cleaning materials recommended by manufacturer or surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 FINAL CLEANING:

- A. General:
 - 1. Use experienced workmen, or professional cleaners, for final cleaning.
 - 2. Maintain cleaning until the building, or portion thereof, is occupied by the Owner.
- B. Remove grease, dirt, dust, stains, labels, fingerprints, and other foreign materials, from interior and exterior surfaces.
- C. Repair, patch, and touch up marred surfaces to match adjacent finishes.
- D. Wash all glass installed as work of this contract.
- E. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
- F. Vacuum clean carpeted and similar soft surfaces.
- G. Clean resilient and hard surface floors as recommended by manufacturer.
- H. Clean surfaces of equipment; remove excess lubrication.
- I. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
- J. Clean light fixtures and lamps.
- K. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.
- L. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01720 - CONFORMED CONSTRUCTION DOCUMENTS (AS-BUILTS)

PART 1 - GENERAL

1.01 GENERAL:

- A. Submit Conformed Construction Documents as required by Section 01700 herein specified and obtain written receipt from Architect.
- B. Each prime contractor shall, upon completion of the construction work, furnish the Owner with three (3) paper sets and two (2) electronic copies (PDF acceptable) of Conformed Construction Documents.
 - 1. The Contractor shall either use and reproduce the documents they are entitled to via the contract or they shall request and pay for additional sets from the Architect.
 - a. Electronic drawing files, AutoCAD format, may be available, at the discretion of the Architect, for a cost of \$25.00 per drawing. Contractors requesting this service will be required to sign a disclaimer. Request for electronic files must be made in writing to the Architects office. This request must include a specific list of drawings required in this format. In response, the architect will verify the drawings requested and will forward the disclaimer for signature. Electronic files will be released upon receipt of payment and a fully executed disclaimer.
 - 2. Incorporate all changes due to addenda modifications, change orders, field conditions and record actual locations of all items clearly and neatly. Submit prints when requested by the Architect for interim approval. Review may be made periodically during the job.
- C. The Architect will review Conformed Construction Documents prior to transmittal to Owner. If in the Architect's opinion, the submitted Conformed Construction Documents are lacking or inadequate, the Contractor shall revise and resubmit accordingly.

1.02 BUILDING CONSTRUCTION AND RECONSTRUCTION:

- A. General Construction:
 - 1. Incorporate plan changes, structural changes, and general building layout changes. For buried construction, include tie dimensions.
- B. Mechanical Construction:
 - 1. Incorporate ductwork and revisions/re-routing, registers and

diffusers, piping runs, valve locations and identification, pump locations and identification, and equipment location. For buried construction, include tie dimensions.

C. Electrical Construction:

1. Incorporate large conduit runs, switchgear and panel locations, equipment locations, and controls locations. For buried construction, include tie dimensions.

D. Plumbing Construction:

1. Incorporate above ground and underground piping runs, clean-outs, and valve locations and identification. For buried construction, include tie dimensions.

1.03 SITE WORK:

A. Parking Lot, Pavement, Fields and General Site Construction:

1. Provide a survey, signed and sealed by NYS licensed Land Surveyor. Mark-ups of the Construction Documents will not be accepted unless agreed to in advance by the Architect for small-scope projects only.
 - a. If a land survey of existing conditions is provided in the Construction Documents, the contractor shall update that land survey as the basis of the as-built, utilizing the surveyor that performed said original survey.
2. Incorporate layout changes, drainage structure locations, piping locations, invert elevations, fences, and topography.
 - a. If site work is relevant to a new building or building addition, provide actual finish floor elevations at all doorways, and actual building perimeter locations and dimensions.

B. Utility Service Construction:

1. Provide a survey, signed and sealed by NYS licensed Land Surveyor. Mark-ups of the Construction Documents will not be accepted unless agreed to in advance by the Architect for small-scope projects only.
 - a. If a land survey of existing conditions is provided in the Construction Documents, the contractor shall update that land survey as the basis of the as-built, utilizing the surveyor that performed said original survey.
2. Incorporate layout changes, electrical primaries and secondaries, transformers, water services, gas services, sewer lines, and sanitary systems with leaching structure locations, piping locations, and invert elevations.

- a. Include tie dimensions to visible above ground elements for buried construction.

END OF SECTION

DIVISION 2-SITE WORK

SECTION 02000 - SITE WORK GENERAL PROVISIONS

1.01 GENERAL:

- A. Applicable provisions of the "Conditions of the Contract" shall govern the work of this section and under Division 2.

1.02 SCOPE/SUMMARY:

- A. The Drawings and Specifications are intended to provide for a complete and ready for operation installation. However, both the Drawings and Specifications are for the Contractor's guidance and are not intended to give every detail of the existing conditions or new installations nor do they describe every fitting required for the installation of the work. The Contractor shall furnish, install, and place in workmanlike manner all equipment, accessories, supports, fittings, and all other material needed for the complete installation.
- B. Before submitting his proposal, the Contractor shall be fully informed to the extent, character and intent of the work to be done by him. No consideration will be granted for any misunderstanding of the material to be furnished or work to be performed.
- C. The site work scope shall include providing all plant facilities, labor, materials, tools, equipment, appliances and supervision necessary or incidental to complete site work, including, but not limited to, the following:
 - 1. Surveying and layout work
 - 2. Preliminary work
 - 3. Demolition
 - 4. Clearing and grubbing
 - 5. Striping and stockpiling existing topsoil
 - 6. Protection
 - 7. Removal and disposal
 - 8. Rough grading, excavating, filling, backfilling and dewatering
 - 9. Excavating, trenching, and backfilling for utility systems including gas, water, electric, telephone, storm and sanitary lines.
 - 10. Sediment and erosion control procedures as may be required.
 - 11. Storm water drainage systems, catch basins and manholes
 - 12. Site improvements, including but not limited to, fencing, curbing, striping, signage, guardrails, paving, lighting, retaining walls and miscellaneous related work.
 - 13. Landscape work
 - 14. Finish grading and paving
 - 15. Site work water mains, electric and gas services
 - 16. Sanitary sewer systems, including manholes and exterior grease traps
 - 17. Concrete work in connection with site preparation and development
- D. Perform all work in accordance with all applicable local, state, and federal codes, laws, and ordinances.

- E. Sediment and erosion control procedures shall be performed as required and in conformance with specification section 02220; and for LEED Certified projects, in accordance with the requirements of LEED SS Prerequisite 1
- F. If the project is of a size and scope that requires a Storm Water Pollution Prevention Plan (SWPPP) refer to additional documentation provided elsewhere herein and conform to its requirements in conjunction with and as related to this section.

1.03 GENERAL PROVISIONS:

A. Verifying Existing Conditions:

1. The Contractor, before submitting his bid, shall examine the site to which this work is in any way dependent upon according to the intent of these Specifications and accompanying Drawings. He shall report to the Architect, in writing, prior to his bid any conditions which prevent him from performing his work. No "Waiver of Responsibility" for inadequate, incomplete, or defective work will be considered by the Architect unless written notice has been filed by the Contractor.

B. Cooperation:

1. When a project involves construction on an existing occupied site, the work called for in this Specification and indicated on the accompanying Drawings shall be carried on in conjunction with the continued operation of the existing building and shall be so arranged that its installation and operation will conform with and facilitate the early installation of work.
2. The Contractor shall bear the expense required to revise his work due to any failure to coordinate the installation of his work with that of the building's operation.
3. The Contractor shall be responsible for the distribution and information concerning his work as required for the prompt installation and coordination with other trades.

C. Accessibility and Clearances:

1. The Contractor shall inform himself fully regarding peculiarities and limitations of space for the installation of the materials and equipment under Division 2. He shall verify all dimensions and conditions in the field. No extra compensation will be allowed because of differences between actual dimensions and the sizes shown on the Drawings.
2. The Contractor shall see that equipment and apparatus necessary to be reached from time to time for operation and maintenance are made easily accessible.

3. Although the location of items may be shown on the Drawings in a specific place, the construction may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such case, the Contractor shall call the Architect's attention to same before installing the work and shall be guided by the Architect's instruction.

1.04 PRELIMINARY WORK:

- A. Before starting the work, make a thorough inspection of the work area to determine the physical condition of natural features and adjacent improvements to remain.
- B. Provide complete mark out/tone out of existing utilities for coordination of proposed work. Repair any damage that occurs to existing utilities to remain at no additional cost to the owner.
- C. Notify all authorities owning utility lines running to or on the property. Protect and maintain all utility lines that are to remain on the property and cap those that are not required in accordance with the instructions of the utility companies or local authorities having jurisdiction over them.

PART 2 - PRODUCTS

This part not used.

PART 3 - Execution

3.01 PROTECTION:

- A. The Contractor shall effectively protect, at his expense, all materials and equipment, including his employees, during the period of construction, and he shall be held responsible for all damage done to his work, until the same is fully accepted by the Architect.
- B. Provide protection necessary to prevent damage to existing building(s), concrete, pavement, utilities or vegetation indicated on the Contract Documents to remain. Box or otherwise protect from damage all trees, shrubs, lawns, etc. which are to be preserved. Trees shall be kept free from guy lines. Remove all protection when work is completed and when authorized to do so by the Architect.
- C. Protect improvements on adjoining properties and on Owner's property.
- D. Restore damaged improvements to original condition as acceptable to Architect and/or Owner.
- E. Protect the property, adjoining properties, wetlands, etc. from damage by soil erosion by installing silt fences and hay bales or as indicated in the projects Storm Water Pollution Prevention Plan, if one is applicable.

- F. Conduct site operations to ensure minimum interference with parking lots, roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct parking lots, streets, walks, or other occupied or used facilities without permission from the Owner and/or authorities having jurisdiction.
- G. Provide traffic control as required, in accordance with the New York State Department of Transportation "Manual of Uniform Traffic Control Devices" and the local jurisdiction traffic safety requirements.
- H. Streets, roadways, parking lots, etc. shall be thoroughly cleaned and/or swept on a daily basis.

3.02 CLEARING and GRUBBING:

- A. Clear and grub in the areas of the proposed building, paved areas and/or site improvements in preparation for rough grading and new construction.
- B. Completely remove all trees, shrubs, stumps, roots, vegetation, growth, paving, boulders, rocks, rubbish, and all other material interfering with the installation of new construction or not suitable for rough or finished grading, except trees or shrubs directed or indicated to remain.
- C. Remove all roots 1" in diameter or larger. Remove all boulders and rocks larger than 3" in largest dimension.
- D. Remove all topsoil, peat, and soils containing a high degree of organic matter. (Coordinate with Item 3.03 below)
- E. Remove all soft clay soils and rubbish fills.
- F. Excavation resulting from the removal of trees, roots, and the like shall be filled with suitable on-site material or imported fill as approved by the Architect/Engineer. Place fill material in horizontal layers not exceeding 8" loose depth, and thoroughly compacted per fill requirements.

3.03 STRIPPING and STOCKPILING EXISTING TOPSOIL:

- A. Existing topsoil and sod on the site within area designated on the drawings shall be stripped to whatever depths encountered to prevent intermingling with underlying subsoil or other objectionable material. Cut heavy growths of grass from areas before stripping.
- B. Free the topsoil of stones, roots, brush, rubbish, clay or other unsuitable materials/objects over 2" in diameter, and remove the latter from the premises before stockpiling the topsoil.
- C. Care shall be taken not to contaminate the topsoil with clay or other unsuitable materials and remove the latter from the premises before stockpiling the topsoil.

- D. Stockpile topsoil in storage piles where indicated or permissible within site staging perimeter (coordinate with Architect and/or Construction Manager). Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Excess topsoil shall be removed from the site by the Contractor unless specifically noted otherwise on the drawings.
- E. Refer to soil erosion and sediment control drawing, if included, for additional details.

3.04 DEMOLITION:

- A. Existing structures (where indicated), concrete and paving on the site (where indicated), including all existing/discovered inactive cesspools, cisterns, wells, foundation materials shall be completely demolished and all debris removed from the site. Excavation resulting from the removal sub-surface structures, foundations/footings shall be filled with suitable on-site material or imported fill as approved by the Architect/Engineer. Place fill material in horizontal layers not exceeding 8" loose depth, and thoroughly compacted per fill requirements.
- B. Remove existing above grade and below grade improvements and abandoned underground piping or conduit as shown on the drawings or necessary to permit construction and other work.
- C. All work shall be executed in such a manner as not to endanger the safety of the workmen or the public. All barriers and precautionary measures shall be erected as required.

3.05 REMOVAL and DISPOSAL:

- A. Dispose of all debris resulting from the work of this section. Haul off site and dispose of legally.
- B. Do not burn rubbish, organic matter, etc. on the site.
- C. Do not bury concrete, rock, stumps/roots, etc. on the site.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02105 - STAKE OUT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all plants, labor, tools, appliances, equipment, materials, and services required for the work indicated on the drawings and specified for this section.

PART 2 - MATERIALS

2.01 PRODUCTS

- A. Not applicable to this section.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall employ a competent registered (New York State) surveyor to lay out the work and to establish all points, lines, and grades necessary for the proper execution of the work. The surveyor shall contact the Owner's representative before laying out the work at the site in order to coordinate the proper alignment of the work.
- B. The Contractor shall have his engineer or surveyor place a sufficient quantity of stakes so that the location of all items to be installed can be clearly determined. This portion shall also be coordinated with the Owner's representative before commencing work.
- C. At the completion of the work, the Contractor must submit to the Owner's representative a signed certification of the accuracy of the vertical elevations and horizontal locations of the work in relation to the contract plans. This must take the form of "as-built" drawings (a transparency of the contract plans may be used) and shall bear the signature and registration number of a registered New York State surveyor hired by or in the employ of the Contractor. This will be strictly enforced so that the Owner may have an accurate record of the completed work.
- D. Should any discrepancy be found between points, lines, or grades shown on the drawings and actual conditions found in the field, the Contractor shall immediately notify the Owner's representative of such discrepancy, and the Contractor will not proceed with the work affected thereby until he has received the necessary instructions from the Landscape Architect or his representative.

- E. The Contractor shall carefully maintain any benchmarks, monuments, and other reference marks, and, if disturbed or destroyed, replace as directed. All markers, permanent stakes, and any other reference marks used in the layout shall be left in place as directed by the Owner's representative.

END OF SECTION

DIVISION 2 - SITE WORK
SECTION 02200 - EARTH WORK
PART 1 - GENERAL



1.01 GENERAL

- A. Applicable provisions of the "Conditions of the Contract" shall govern all work under this section.
- B. Contractor must observe and adhere to New York Code, 6 NYCRR, Chapter IV and all applicable Subchapters and Parts for the receipt of, or removal, transport, tracking and disposal of all soils and construction waste and debris, as enforced by the New York State Department of Environmental Conservation. All fees associated with testing of materials and debris either at the point of origin (site) or point of termination, are to be borne by the Contractor.

C. Related Documents:

- 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.
- 2. Specification Section 02000 - Site Work General Provisions.
- 3. Specification Section 02270 Sediment and Erosion control Procedures and Requirements
- 4. Specification Section 02400 Site Drainage Structures and Castings
- 5. Specification Section 02600 Hot Mix Asphalt Pavement
- 6. Specification Section 03300 Cast In Place Concrete
- 7. Other Division 2 Site Work Sections related to the work of the Contract as applicable.

1.02 SCOPE/SUMMARY

- A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not limited to, the following:
 - 1. Erect and maintain barriers in accordance with all local municipal and state requirements.
 - 2. Remove all obstructions in the way of new construction work which may be required in addition to clearing and removal work specified under Section 02000 - Site Work General Provisions.

3. Excavation and preparation of sub grade for building slabs, floor slabs, depressions and pits, foundations, interior and exterior column footings, walks, stairs, ramps, and pavements. All other excavation which may be required to complete the work and is not specified under other sections.
 4. Shoring, sheathing, and pumping.
 5. Backfilling all work within building lines to the required grades.
 6. Granular fill course for support building slabs is included as part of this work.
 7. Excavating and backfilling of trenches within building lines.
 8. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances, transformer pads, and conduits for same, underfloor utility lines, etc. inside or outside of the building footprint.
 9. Filling and grading.
 10. Finish grading of sub grade.
 11. Finished grades.
- B. Final grading, together with placement and preparation of topsoil for lawns and planting, is specified elsewhere in Division 2, Site Work Section.

1.03 DEFINITIONS

- A. Excavation consists of removal of material encountered to subgrade elevations indicated or required by the work and subsequent disposal of materials removed. Materials to be excavated shall be non-classified and shall include all rock, earth, or other materials encountered in excavating and grading operations for building or site work. The contract price covers the removal of all such materials to the depth and extent indicated on the drawings specified herein or as required to perform the work.
- B. Unauthorized excavation consists of removal of materials beyond required sub grade elevations or dimensions without specific direction of the Soils Engineer. Unauthorized excavation, as well as remedial work directed by the Soils Engineer, shall be at the Contractor's expense.
1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation with compacted controlled structural fill material or by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
 2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Construction Manager (when applicable), Architect or the Soils Engineer.

- C. Additional Excavation: When excavation has reached required subgrade elevations, notify the Architect/Engineer, who will make an inspection of conditions. If Architect/Engineer (based upon Soils Engineer's reports) determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by the Soils Engineer.
 - 1. Removal of unidentified unsuitable materials and its replacement beyond the limits required for the construction work as directed will be paid on basis of Conditions of the Contract relative to changes in the work.
- D. Sub grade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.
- E. Fill is that material removed from excavations or imported from off site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter. Fill material is subject to approval.
- F. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

1.04 SUBMITTALS

- A. Test Reports: The Contractor shall submit the following reports directly to the Construction Manager (if applicable), the Owner, and the Architect:
 - 1. Test reports on borrow material.
 - 2. Verification of suitability of each footing subgrade material, in accordance with specified requirements including substantiation of and structural capacity of existing rock on which new footings are to bear.
 - 3. Field reports; in-place soil density tests.
 - 4. One optimum moisture-maximum density curve for each type of soil encountered.
 - 5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- C. Use equipment adequate in size, capacity, and numbers to accomplish the work of this section in a timely manner.

- D. Engineering, Testing, and Inspection Services: The Contractor shall make arrangements for and the Owner shall pay for a qualified independent geotechnical testing laboratory and associated soil engineer (acceptable to the Owner) to perform soil survey and soil testing service for sampling and testing of materials proposed to be used as well as substantiation and verification of existing subsurface conditions when desired depths of excavation are reached. The Contractor will be responsible for all costs associated with failed tests resulting from their work.
- E. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory and associated soils engineer must demonstrate to the Owner's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the work.

1.06 SOILS ENGINEER (SERVICES AS EMPLOYED AND PAID BY THE OWNER)

- A. For site conditions without complex soil problems, a registered soils engineer shall be engaged to perform the following minimum services:
 - 1. Examine on-site materials to determine suitability for use.
 - 2. Recommend locations for placing on-site materials.
 - 3. Recommendations for compacting on-site materials.
 - 4. Determine suitability of soil under footings, foundations.
 - 5. Perform compaction tests and supervise filling operations.
- B. Soils engineer's services for problem site conditions shall include the above and the following additional work at minimum:
 - 1. Determine extent of unsuitable material removal.
 - 2. Testing of materials proposed for use from off-site and on-site sources.
 - 3. Dewatering recommendations.
 - 4. Supervising the placing and compacting of approved materials and under footings, foundations, slabs, utility lines, and paved areas.
 - 5. Supervising environmental protection procedures as required by Federal, State, and Municipal Agencies.

NOTE: Copies of soils reports prepared by soils engineer are to be sent to the Owner, the Architect, and Construction Manager (if applicable).

1.07 PROJECT CONDITIONS

- A. Site Information: Data in subsurface investigation reports were used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as

representations or warranties of accuracy or continuity between soil borings. The Construction Manager, The Architect, and the Owner will not be responsible for interpretations or conclusions drawn from these data by the Contractor.

1. Additional test borings and other exploratory operations may be performed by the Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
- B. Examine the areas and conditions under which the work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- C. Set all lines, elevations, and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.
- D. Existing Utilities: Locate existing underground utilities in areas of excavation work. This work to be substantiated and paid by this Contractor. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. If damaged, repair or replace at no additional cost to the Owner.
 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with the Owner, the Construction Manager (if applicable) and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 2. Do not interrupt existing utilities service facilities occupied by the School or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.
 3. Provide minimum 48-hour notice to the Construction Manager (when applicable), Architect, and Owner, and receive written notice to proceed before interrupting any utility.
 4. If service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 5. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Architect and secure his instructions.
 6. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- E. Use of Explosives: Use of explosives is permitted for certain types of rock removal only but that use must be substantiated with the Owner, Architect/Engineer, State, and Local Agencies prior to bidding and again prior to commencement of work.

1. The use of explosives is only permitted when the Owner has been notified of same by written notice of the Contractor through Architect/Engineer, thereby permitting the Owner and its surrounding neighbors the required legal notices to vacate and/or protect their properties, buildings, homes, or premises as needed.
- F. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 3. Provide all protective measures necessary for the safety of workmen. The above shall be carried out in accordance with and in compliance with regulations of local, county, federal, and OSHA authorities having jurisdiction over same. Protection is entirely the responsibility of the Contractor.
 4. The work shall be executed so that no damage or injury will occur to the Owner's property or building, to public and adjoining or adjacent structures, streets, paving, sewers, gas, water, electric, or any other pipes. Should any damage or injury caused by the Contractor or anyone in his employ, or by the work under this Contract occur, the Contractor shall, at his expense, make good such damage and assume all responsibility for such injury.
 5. The above shall also include the protection of all existing sewers and drainage systems to remain in use within the area affected by the work of this project.
 6. Monuments, benchmarks, and other reference features on streets bounding this project shall be protected. Should these be disturbed in any manner, the Contractor shall have them replaced.
 7. Use every means necessary to prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
 8. Maintain access to adjacent areas at all times.
- G. The Contractor is to acquaint himself with the existence and location of all surface and subsurface structures and utilities within the project area. He is not to damage any of those that are to remain, and he is to leave them accessible and make the necessary provisions by sheeting, hanging, supporting, or other means necessary to obtain this result, subject to the approval of Architect/Engineer, the local municipality, the utility company involved, and any other agencies having jurisdiction over this project.
- H. Prior to entering his bid, the Contractor shall visit the site and familiarize himself with all existing conditions. All nearby

existing buildings and utilities shall be inspected by the Contractor prior to entering his bid.

- I. Borings were prepared by others, and provided by the Owner. The Geotechnical Report contained herein shall be reviewed prior to bid. The documents are for information only. Contractor shall interpret for themselves the soil condition underlying the surface of the ground.
- J. Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.
- B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CG, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Granular Fill: Naturally or artificially graded mixture or natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand meeting requirements for New York State Department of Transportation Standard Specification 304.2.02, Type 4 unless otherwise indicated.
- D. Subbase Material: Graded mixture of crushed rock, with 100 percent passing a 2-inch sieve and meeting requirements for New York State Department of Transportation Standard Specification 3.04-2.02, Type 2, unless otherwise indicated.
- E. Backfill and Fill Materials: Satisfactory non-expansive soil materials free of organic material, roots, other deleterious substances, clay, rock or gravel larger than 2 inches in any dimension, debris, waste and frozen materials.

2.02 CONTROLLED STRUCTURAL FILL OR MATERIAL

- A. Imported controlled structural fill shall consist of inert material that is hard, durable stone and coarse sand, practically free from silts, clay, frozen sections, and foreign substances. It may consist of either natural or washed soil and must be free of organics. The material shall be a well graded mixture, shall have no material larger than 4", and must have the following gradations by weight:

Maximum retained on 3/4-inch sieve:	30%.
Maximum retained on No. 4 sieve:	50%.
Maximum passing 100 sieve:	25%.
Maximum passing 200 sieve:	5%.

This grading shall be determined in accordance with ASTM Standard Specification C117 and C136.

2.03 SUB BASE FILL OR MATERIAL

- A. Sub base fill shall consist of inert material that is clean, hard, durable stone, sand, and non-plastic silt completely free from clays, frozen sections, and foreign substances. It may consist of either natural or washed soil and must be free of organics. The sub base fill shall be a well graded mixture, shall have material not larger than 2 inches, and must comply with the following grain size gradation by weight:

Maximum passing No. 100 sieve: 35%.

Maximum passing No. 200 sieve: 25%.

This grading shall be determined in accordance with ASTM Standard Specification C117 and C136.

2.04 WEED KILLER

- A. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this work by governmental agencies having jurisdiction.

2.05 TOPSOIL

- A. Where and if shown on the drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones, noxious weeds, sticks, brush, litter, and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.06 OTHER MATERIALS

- A. Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Excavation Classifications: The following classifications of excavation will be made when rock is encountered:
1. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
 2. Rock excavation for trenches and pits includes removal and disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 215C LC, and rated at not less than 115 HP flywheel power and 32,000-pound drawbar pull and equipped with a short stick and a 42-inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped)

capacity.

3. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.
4. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered that cannot be dislodged and excavated with modern, track-mounted, heavy-duty excavating equipment without drilling, blasting, or ripping. Rock excavation equipment is defined as Caterpillar Model No. 973 or equivalent track-mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000 pound breakout force (measured in accordance with SAE J732).
 - a. Typical materials classified as rock are boulders 1/2 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
 - b. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
5. Rock Excavation:
 - a. In the event that rock is encountered and is of a type that cannot be broken up and excavated by machine or moved into deep fill areas, blast as necessary, and remove and dispose of same off site.
 - b. Rock that can be broken up, excavated by machine, and/or moved into deep fill areas shall be reduced to a size not exceeding 6" prior to depositing in deep fill areas.
 - c. Definition: Whenever the word "removal" is used in connection with rock, it is to be construed to mean "blasting, excavating, and the removal of rock that cannot be broken up by machine and removed", as defined previously.
 1. As this facility is in session daily Monday through Friday and its surrounding neighbors are contiguous, the preferred methodology of excavation and removal of rock is to be construed as "passive" in nature--meaning "drilling or any other passive means". The excavation contractor shall coordinate his/her work with the Owner's representative so as to perform that work with the least disruption to the Owner and the Owner's neighbors and with maximum intent to the safety of same. The preferred time of rock removal work shall take place when the Owner's facilities are vacated, thereby meaning after the close of school each day or on weekends, as long as these times are permitted by all State and Local Ordinances and are acceptable and coordinated with the School and its neighbors.

- d. Blasting shall conform strictly to all local and state laws, rules, and regulations applying thereto, and shall avoid excess noise and vibration. Steel mats shall be provided where necessary to prevent damage from flying fragments. Drill holes shall not be carried any further than necessary to remove the rock desired. The care, handling, and storing of explosives shall conform strictly to all local and state laws, rules, and regulations applying thereto. After concrete is set in place, no blasting shall be done except with the written permission of the Owner, and Architect.
- e. The Contractor may consider the utilization of "Super Bristar 2000", a non-explosive demolition agent as a means of rock removal for this project.
- f. General:
 - 1. Blasting shall be done as necessary for breaking rock for removal to depths, limits, and extent required for the construction of the building, site grading, and utility lines.
 - 2. Blasting shall be performed only by experienced, competent, licensed personnel under the direct supervision of an experienced, competent, licensed foreman.
- g. Precautions:
 - 1. Blasting shall be permitted only when proper and adequate precautions have been taken for the protection of personnel, work, and property.
 - 2. Caps, fuses, and other exploders shall in no case be stored in the same place in which explosives are stored.
 - 3. All operations involving delivery, handling, storage, and the use of explosives shall be conducted in accordance with applicable laws, statutes, and regulations of the State, Municipal, or other governing bodies having jurisdiction. Likewise, the blasting contractor shall secure and pay for all necessary permits on behalf of the excavation contractor/contractor and shall provide same to the Owner, and Architect prior to scheduling the work. Open rock and rock in trenches shall be removed to a depth of 8" below required grades.
- h. Do not perform rock excavation work until material to be excavated has been cross sectioned and classified by the Contractor's qualified independent geotechnical testing laboratory and associated soils engineer (employed and paid by the Contractor), and as approved by Architect/Engineer.
- i. Rock payment lines are limited to the following:

1. Three feet outside of concrete work for which forms are required, except footings.
2. Two feet outside perimeter of footings.
3. In pipe trenches, 6 inches below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3 feet minimum trench width.
4. Outside dimensions of concrete work where no forms are required.
5. To bottom of all footings which, as designed, are minimum 1'-8" below finished floor and are to bear on undisturbed rock of 8 T.S.F. bearing capacity minimum. This capacity to be verified by Contractor's geotechnical testing laboratory and associated soils engineer.
6. Under slabs on grade, 6 inches below bottom of concrete slab.
7. Work indicated herein under these rock payment lines is part of this Contractor's base bid.

3.02 STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. The Contractor shall safely support and maintain adjacent and abutting property and structures and shall maintain the work safe to life, limb, and property.
- C. Barriers, sheet piling, bracing, and the like shall be installed where required to maintain the excavation and the banks in a safe and stable condition.
- D. Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen is required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.
- E. Slope sides of excavations to 1:1 or flatter or to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- F. Shoring and bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.
- G. All temporary sheet piling, bracing, shoring, and other protective work shall be removed after the necessity for same ceases to exist, in the opinion of the Architect, and before backfilling.

- H. All work removed or damaged through the installation or removal of the temporary protective work or through improper protection work shall be replaced or repaired in an approved manner at no cost to the Owner.
- I. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the work.

3.03 DEWATERING

- A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
- B. Surrounding soil shall not be disturbed or removed during pumping operations.
- C. Water shall be disposed of by pumping to a point directed by the Architect without damage to adjacent property.
- D. The Contractor shall provide, operate, and maintain adequate equipment to keep the excavations free from water so that the excavating, concrete work, membrane waterproofing, and all other work in the excavations will be performed in the dry.
- E. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

3.04 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 - 2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.05 EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from

footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

- B. Contractor shall prepare building and sidewalk areas to underside of floor slab plus or minus 1/2". Under no circumstances shall any material other than approved on-site material, or specified imported controlled structural fill be used for filling within a depth of 10" inches below building and sidewalk slabs on grade or within a depth of 12" beneath all column or wall support footings. Imported controlled structural fill shall also be utilized in all areas supporting earthen or other load carrying structures where organic soil materials are encountered subsequent to the removal of said organic soil materials.
- C. Excavations for footings and foundations: Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work. Piers, concrete slabs, and footings shall be benched a minimum of 2" into rock at sloping rock conditions as indicated on the drawings where no excavation is required.
- D. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction, and for inspection. Do not disturb bottom of excavations intended for bearing surface.
- E. Unsuitable Material: All unsuitable material below the grading plane shall be excavated and removed and the space filled with granular material as specified herein.
 - 1. Unsuitable materials are those soils that exhibit characteristics that make them unsuitable for the direct support of the pavement structure, such as organic silt, elastic clays and silts, topsoil, frost susceptible soils, etc. Unsuitable materials shall be removed to the depth directed by the Soils Engineer and the Construction Manager when applicable.
 - 2. The excavation and disposal of unidentified unsuitable material below the grading plane shall be paid on the basis of the Conditions of the Contract relative to Changes in the Work.
 - 3. The granular fill material will be used in the fill sections within the paving area. No additional payment will be made for placing this material in the fill areas.
- F. Unsuitable material will be legally disposed of off site.

3.06 EXCAVATION FOR PAVEMENTS, SLOPES, DITCHES, ETC.

- A. The work under this item shall consist of the following in accordance with the plans, specifications, addenda, bid proposal, and requirements herein: excavating for pavement, slopes, ditches, and all other work incidental to the excavation for the pavement, including disposing of unsuitable and surplus material, preparing

the subgrade, compaction, grading, slopes and shoulders, and all other work needed to complete the item.

- B. Cut surface under pavements to comply with cross sections, elevations, and grades as indicated.
- D. Drainage and Site Maintenance: During construction, the site shall be maintained in such condition that it will be adequately drained at all times.
- E. Unsuitable Material: All unsuitable material below the grading plane shall be excavated and removed and the space filled with granular material as specified herein.
 - 1. Unsuitable materials are those soils that exhibit characteristics that make them unsuitable for the direct support of the pavement structure, such as organic silt, elastic clays and silts, topsoil, frost susceptible soils, etc. Unsuitable materials shall be removed to the depth directed by the Soils Engineer and the Construction Manager when applicable.
 - 2. The excavation and disposal of unidentified unsuitable material below the grading plane shall be paid on the basis of the Conditions of the Contract relative to Changes in the Work.
 - 3. The granular fill material will be used in the fill sections within the paving area. No additional payment will be made for placing this material in the fill areas.
- F. Unsuitable material will be legally disposed of off site.
- G. The Contractor shall store topsoil, embankment soils, and other materials, and/or to excavate beyond the limits of the contract and slope easements. The cost of stockpiling and rehandling shall be included in his base bid price.
- H. All soils that are classed as suitable for the direct support of the pavement (non-organic and non-frost susceptible soils) shall be scarified to a loose depth of ten (10) inches and recompact to 95% of the maximum density at the optimum moisture content of the soils determined by ASTM D-1557. The moisture content at the time of compaction shall not be greater than one (1) percent nor less than two (2) percent by weight of dry soil of the optimum moisture content. Dry soils shall be moistened and thoroughly mixed to the required moisture content. Wet soils shall be dried by aerating the required moisture content.
 - 1. The cost of adding moisture, drying, and compaction shall be included in the Contractor's base bid price.
- I. Subgrade in excavated areas for new pavement shall be compacted to the density specified below. Soils not conforming to this density shall be scarified or loosened to a depth of ten (10) inches, water added in the amount necessary, and the material recompact to provide the required density.
 - 1. Compaction control will be provided as follows: The subgrade in excavated areas shall be compacted to at least ninety-

five (95) percent of the maximum density as determined by the "Test for Moisture Density Relations of Soils using a 10 lb. Rammer and 18 inch Drop", ASTM D-1557 as currently revised. Samples of subgrade materials for testing purposed shall be taken at frequent intervals daily. From these tests, corrections and changes in moisture content will be made and compaction continued until required densities are achieved.

- J. The Contractor shall check the work under this Item with templates, slope boards, or other devices satisfactory to the Soils Engineer. The completed work shall conform to the plans within the following tolerances.
- K. For pavement subgrade, the surface shall vary no more than three-quarter ($\frac{3}{4}$) inch from a ten (10) foot straight edge applied to the surface, and the actual grade of the subgrade shall not vary more than one (1) inch from plan elevation.

3.07 TRENCH EXCAVATION FOR PIPES AND CONDUIT

- A. Excavate trenches to uniform width, sufficient wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both side of pipe or conduit.
- B. Accurately cut trenches for pipe or conduit that is to be installed to designed elevations and grades to line and grade from 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill and compact in maximum 6" layers measured loose to the top of the trench.
- C. Excavate trenches and conduit to a depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost lines.
 - 1. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.
 - 2. For pipes or conduit less than 6" in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
 - 3. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90° (bottom $\frac{1}{4}$ of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensuring continuous bearing of pipe barrel on bearing surface.
 - 4. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects.
 - 5. When the void is below the sub-grade for the utility bedding, use suitable earth materials and compact to the relative

density of 95 percent (in accordance with ASTM D698).

6. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated to a relative density of 92 percent (in accordance with ASTM D1557).
 7. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.
- D. The local utility companies shall be contacted before excavation shall begin. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous uniform bedding.
- E. All trench excavation side walls greater than 5 feet in depth shall be sloped, shored, sheeted, braced, or otherwise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.
- F. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.
- G. Trench width requirements below the top of the pipe shall not be less than 12" nor more than 18" wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit, or cable shall be at least practical width that will allow for proper compaction of trench backfill.
- H. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances:
1. Water mains: 50" to top of pipe barrel.
 2. Sanitary Sewer: Elevations and grades as indicated on drawings (48" minimum cover).
 3. Storm Sewer: Depths, elevations, and grades as shown on drawings.
 4. Electrical Conduits: 30" minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or the local utility company requirements, whichever is deeper.

5. TV Conduits: 18" minimum to top of conduit or as required by the local utility company, whichever is deeper.
6. Telephone Conduits: 30" minimum to top of conduit, or as required by the local utility company, whichever is deeper.
7. Gas Mains and Service: 30" minimum to top of pipe, or as required by the local utility company, whichever is deeper.
8. Where utilities are under a concrete structure slab or pavement, the minimum depth need only be sufficient to completely encase the conduit or pipe sleeve, and electrical long-radius rigid metal conduit riser, provided it will not interfere with the structural integrity of the slab or pavement.
9. Where the minimum cover is not provided, encase the pipes in concrete as indicated. Provide concrete with a minimum 28-day compressive strength of 2,500 psi.

I. Excavating for Appurtenances:

1. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
2. Over-depth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete at no additional cost to the Owner.
3. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.

3.08 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

3.09 BACKFILL AND FILL

- A. All excavations shall be backfilled as promptly as the work permits but not before concrete has attained its full design strength and not until completion of the following:
1. Acceptance of construction below finish grade, including, where applicable, damp-proofing and water-proofing.
 2. Inspecting, testing, approving, and recording locations of underground utilities.
 3. Removing concrete formwork.
 4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.

5. Removing trash and debris within excavated areas.
 6. Placement of horizontal bracing on horizontally supported walls.
- B. No frozen material shall be used. Backfill shall be placed in uniform horizontal layers of approximately 8" in depth. Each layer shall be moistened during compaction. Compaction shall be done in a manner approved by the Architect and shall be continued until fill is solid and no settlement will occur.
 - C. When sheeting, shoring, and bracing is removed, all voids shall be filled with sound materials and thoroughly tamped.
 - D. Backfill operations shall be made to the new surface grades as shown on the drawings.
 - E. No backfill shall be placed covering other work until after such work has been inspected and approved. Any backfilling placed on earth that has caved in and covered other work before same has been inspected and approved shall be removed when so directed.
 - F. Excess material, if any, and all rubbish shall be removed from the site or otherwise disposed of as may be directed by the Architect.
 - G. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified herein.
 1. Under grassed areas, use satisfactory excavated or borrow material.
 2. Under walk sand pavements, use subbase material.
 3. Under steps, use subbase material.
 4. Under foundations, use controlled structural fill material.
 5. Under building slabs, use granular material or on site subgrade material if determined acceptable by the Architect or Soils Engineer.
 6. Under piping, conduit, and equipment, use subbase materials where required over rock bearing surface unless otherwise indicated. Shape excavation bottom to fit bottom 90° of cylinder.

3.10 CONTROLLED STRUCTURAL FILL OR MATERIAL

- A. Location: Imported controlled structural fill shall be used when necessary to provide proper soil bearing capacity:
 1. Under all proposed buildings and sidewalks and at least 5 feet beyond the limits of the proposed buildings to a depth as required by foundation design where sidewalks are not part of the scope of building work.

2. Under all footings (continuous or spread) to a depth of at least 12 inches, or as required by foundation design.
3. For all load carrying structures which are situated in areas of soft organic soil deposits subsequent to the removal of said soft organic soil deposits.
4. Sand shall be used as bedding for all drainage and sewerage utilities, unless groundwater problems are encountered or anticipated that may require the use of crushed stone.

3.11 SUB BASE FILL OR MATERIAL

- A. Location: The subbase fill may be used in all fill areas where controlled structural fills specified for buildings are not required due to soil conditions, as long as the requirements listed in Section 2.03A are met. Under no circumstances shall subbase material be in directed contact with structural support component, or in support of any of the proposed utilities.
- B. Backfill trenches with concrete where trench excavations pass with 18" of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.
 1. Concrete is specified in Division 3.
 2. Do not backfill trenches until test and inspections have been made and backfilling is authorized by Contracting Officer. Use care in backfilling to avoid damage or displacement of pipe systems.
- C. Provide 4" thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.
- D. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 2. Inspection testing, approval, and recording locations of underground utilities have been performed and recorded.
 3. Removal of concrete formwork.
 4. Removal of shoring and bracing and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities or leave in place if required.
 5. Removal of trash and debris from excavation.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.12 PLACEMENT AND COMPACTION

- A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
 1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- B. Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand operated tampers.
- C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Place backfill and fill materials evenly adjacent to structure, piping or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.
- F. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed if soil density test indicate inadequate compaction.
 1. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density, in accordance with ASTM D 1557 (Modified Proctor):
 - a. Under footings, compact subgrade and subbase material to at least 95% maximum dry density.
 - b. Under structures, building slabs and steps, and pavements, compact top 12" of subgrade and each layer of backfill or fill material to at least 95% maximum dry density.
 - c. Under lawn or unpaved areas, compact top 6" of subgrade and each layer of backfill or fill material to a

MAXIMUM of 85% maximum dry density.

- d. Under synthetic turf, compact top 6" of subgrade and each layer of backfill or fill material to at least 90% maximum dry density.
- e. Under walkways, compact top 6" of subgrade and each layer of backfill or fill material to at least 95% maximum dry density.

G. Moisture Control:

- 1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface during or subsequent to compacting operations.
- 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
- 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests.

3.13 FILLING AND BACKFILLING

A. Filling and backfilling work shall include, but is not limited to, the following:

- 1. Contractor shall place and compact bank-run sand and gravel from approved imported sources consisting of clean bank-run gravel or sandy gravel, free from organic material, loam, wood, trash, snow, ice, and other objectionable material, well graded within the following limits:

Maximum retained on 3/4" sieve: 30%.
Maximum retained on No. 4 sieve: 50%.

Maximum passing 100 sieve: 25-30%.
Maximum passing 200 sieve: 5%.

No material larger than 2-1/2" to 4" sieve size by weight. When available, on-site material may be used in place of imported controlled structural fill with the Soils Engineer's approval.

- 2. Compaction of bank-run gravel under footings, foundation, under slabs on grade, and in building areas shall be to 95% of maximum density in accordance with ASTM Test Designation D1557.
- 3. Granular material where required under footings and foundations shall conform to material and gradations previously specified and shall be determined in accordance with ASTM Standard Specifications C117 and C136.

4. Filling--Imported Controlled Structural Fill: Compaction of the controlled imported structural fill shall be performed at a moisture content 3% drier than optimum as determined in the lab. It shall be placed in uniform layers not exceeding 10 and/or 12 inches thick after compaction. Each lift shall be compacted to not less than 95% of the maximum dry density determined within the lab as modified proctor density and shall be monitored by the soils engineer using the applicable ASTM standard for testing. Each lift shall have a minimum of 2 feet density test per 500 square yards, one located in the area of the propose column and the second located under a continuous wall footing. More frequent testing may be required at the discretion of the Soils Engineer based on the extent of filling on any given day or should any area become suspect.
5. Filling--Subbase Fill: Compaction of all subbase fill, either imported or on-site, shall be compacted at a moisture content 1-1.5% drier than optimum as determined in the lab. The subbase fill shall be placed in uniform layers not exceeding 8 inches in depth when uncompacted. Each lift shall be compacted to not less than 95% of its maximum dry density determined in the lab as modified standard for testing. At least two field density test shall be performed per lift within the area being filled on any given day beneath buildings provided the lift areas do not exceed 500 square yards.

3.14 TRENCH BACKFILLING

- A. Criteria: Trenches shall not be backfilled until required tests are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfill trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.
- B. Backfilling: After pipe or conduit has been installed, bedded, and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts. Compact to minimum density of 95 percent of optimum density in accordance with ASTM D698 (or 92 percent of optimum density in accordance with ASTM D1557).
- C. Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- D. Compaction Testing: Independent testing laboratory shall perform test at intervals not exceeding 200'-0" of trench for the first and every other 8" lift of compacted trench backfill and furnish copies of test results as specified.

3.15 MATERIALS FOR FILL UNDER CONCRETE SLABS ON GRADE

- A. Contractor is to establish building pad at underside of floor slab, plus or minus 1/2".

- B. Prior to placing fill fine grading materials on building pad, existing pad fill shall be leveled and recompact.
- C. Fill materials under concrete slabs on-grade in building areas, under sidewalks, pads, concrete aprons, etc., are to be the sieve analysis previously shown for controlled structural fill.
- D. Compaction of fill shall be as previously set forth. When compacting fill with mechanical compactor against foundation walls, pits, loading dock, etc., Contractor shall provide complete protection against damage to said installations.
- E. There is to be a layer of no less than 6" of clean suitable bank run sand fill below all slabs on grade. On site material may be acceptable and its usability is to be verified via soils reports. The Contractor's bid is to be based on the use of on site material for use under slabs unless indicated otherwise within the Construction Documents.
- F. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum, quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
 - 1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.16 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
 - 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
 - 2. Walks: Shape surface of areas under walks to line, grade, and cross section, with finish surface not more than 1/2" above or below required subgrade elevation.
 - 3. Shape the surface or areas scheduled to be under pavement to line, grade, and cross section, with finished surface not more than 0.05 feet above or below the required subgrade elevation.

- C. Grading Surface or Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10-foot straight edge.
- D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.17 PAVEMENT SUB BASE COURSE

- A. General: Subbase course consist of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.
 - 1. Refer to other Division 2 sections for paving specifications.
- B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
- C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneously with the compaction and rolling of each layer of subbase course.
- D. Placing: Place sub base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
 - 1. When a compacted subbase course is indicated to be 6" thick or less, place material in a single layer. When indicated to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.18 FOOTING AND BUILDING SLAB SUB BASE COURSE

- A. General: Subbase course consists of placement of subbase material, in layers of indicated thickness, over subgrade surface and/or granular fill to support concrete building slabs as indicated on drawings.
- B. Placing: Place material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.
 - 1. When a compacted subbase course is indicated to be 6" thick or less, place material in a single layer. When indicated to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.19 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service and the Construction Manager (when applicable) to inspect and approve each subgrade and fill layer before further backfill and construction work is performed.
1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.
 2. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gauges in accordance with ASTM D3017.
 - a. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work, on each different type of material encountered, and at intervals as directed by the Contracting Officer.
 3. Footing Subgrade: Per each stratum of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested stratum when acceptable to the Construction Manager (if applicable) and the Architect.
 4. Paved Areas and Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, perform one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.
 5. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.
 6. If it is determined by the Construction Manager (if applicable), the Architect, the Owner, and/or Independent geotechnical testing laboratory and associated soils engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.20 EROSION CONTROL

- A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction or if the project is of sufficient size to require one, refer to the Storm Water Prevention and Protection Plan included elsewhere herein.

3.21 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.22 CERTIFICATION

- A. Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Architect a written report from a soil engineer certifying that the compaction requirements have been obtained and the type or classification of fill material placed.

3.23 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. All rubbish and other excavated material, which in the opinion of the Architect is not suitable for fill or grading, shall be removed and legally disposed of away from the premises.
- B. Approved excavated material shall be spread on the site in locations as directed by the Architect.
- C. Excavated material in excess of that required for all filling, backfilling, and rough grading shall become the property of the Contractor and shall be removed from the premises and legally disposed of.
- D. Removal from the School's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off the School's property.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02270 - SEDIMENT AND EROSION CONTROL PROCEDURES AND REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor, as a part of the site development, is responsible for the installation and maintenance of erosion and sedimentation control measures necessary to prevent the transportation of sediments to off-site areas. As such, he shall provide all labor, materials, equipment, tools and incidentals required to assure adequate environmental protection including implementation of all erosion and sediment control measures and site restoration measures as shown, specified and required to complete the Work. For projects that require a specific stormwater pollution prevention plan (SWPPP), see related information provided by others and incorporated within the contract documents.
2. Includes the installation, maintenance, adjustments, dismantling, removal and disposal of all soil erosion and sediment control measures required by the Project.*
3. Includes the disposal by the Contractor of all sediment and erosion control materials removed in legal fashion at an off-site location of the Contractor's choice.
4. Includes the control of dust by the application of water, or other means acceptable to the Architect/Engineer. *Use of Calcium Chloride is prohibited.*

* - The specific methods and materials employed in the installation and maintenance of erosion control measures shall conform to the *New York State Stormwater Management Design Manual* and the *New York Standards and Specifications for Erosion and Sedimentation Control*.

- ###### B.
- For all Projects and for LEED Certified Projects: Soil and Erosion Control Measures must meet the requirements of LEED SS Prerequisite 1 by conforming to the Best Management Practices of the U.S. Environmental Protection Agency (EPA) Document No. EPA 832/R-92-005 (September 1992), Storm Water Management for Construction Activities, Chapter 3, or local erosion and sedimentation controls standards and codes, whichever is more

stringent. The SWPPP/environmental plan shall meet the following objectives:

1. Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protection of soil stockpiles, utilizing jute mesh or erosion control blanket material.
2. Prevent sedimentation of storm sewer or receiving streams.
3. Prevent polluting the air with dust and particulate matter.

C. Coordination:

1. The Contractor shall review requirements and procedures under other sections as specified in D below and coordinate with the Work that is related to this Section.
2. The Contractor shall comply with applicable NYSDEC regulations.
3. The Contractor shall comply with applicable NYCDEP regulations for protection of New York City lands.
4. The Contractor shall comply with Stormwater Pollution Prevention Plan Report, if one has been provided for this project.
5. If the project is of a size and scope that requires a stormwater pollution prevention plan (SWPPP), refer to additional documentation provided elsewhere herein, and conform to its requirements in conjunction with and as related to this Section.

D. Related Sections:

1. Section 01500 - Construction Facilities and Temporary Controls
2. Section 01352 - LEED Requirements
3. Section 02000 - Sitework - General Provisions
4. Section 02200 - Earthwork
5. Section 02485 - Landscape Work and Maintenance Program
6. Section 02801 - Topsoil, Lawns and Grasses

1.02 APPLICABLE REGULATIONS

A. In the performance of the Contract, the Contractor and any Subcontractors shall comply with all applicable Federal, State, and local municipal laws and regulations concerning environmental protection and erosion and sediment control.

B. The Contractor shall comply with the following design standards and guidance documents:

1. *Construction Activity Erosion and Sediment Control Measures: "New York Standards and Specifications for Erosion Control", published by the Empire State Chapter of the Soil and Water Conservation Society. (The Blue Book).*
2. *Post-Construction Stormwater Control Practices, for water quality/quantity controls: "New York State Stormwater*

Management Design Manual", prepared by Center for Watershed Protection, for NYSDEC.

3. *New York City Department of Environmental Protection, The Applicant's Guide to Stormwater Pollution Prevention Plans and Crossing, Piping or Diversion Permits, prepared by NYCDEP Bureau of water Supply Quality and Protection, Engineering and Operations Division, August 2002.*
4. *New York State Stormwater Management Design Manual.*
5. *New York State Dept. of Transportation (NYSDOT) Standard Specifications Construction & Materials, January 2, 1990 & Latest Editions & Addenda.*

The Contractor shall maintain a copy of each of these documents readily available for continuous reference thereto. The Contractor shall also keep a copy of Stormwater Pollution Prevention Plan, if one exists for this project, on site for continuous reference hereto.

- C. The Contractor shall comply with NYSDEC SPDES General Permit No. GP-02-01 for Stormwater Discharges from construction activity.

1.03 SUBCONTRACTORS

- A. Compliance with the provisions of this Section by Subcontractors shall be the responsibility of the Prime Contractor.

1.04 SUBMITTALS

- A. **LEED Submittals: Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements". (For LEED Certified Projects only)**
- B. All submissions shall be made in accordance with the provisions of Section 01300.
- C. Certification Statement - When a SWPPP is provided, all Contractors and Subcontractors shall submit a signed and sealed copy of the following certification statement on company letterhead before undertaking any construction activity at the site identified in the Stormwater Pollution Prevention Plan:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Stormwater Pollution Prevention Plan for the construction site identified in such Stormwater Pollution Prevention Plan as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction

activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

The certification must include the name and title of the person providing the signature in accordance with Part V.H of General (GP-02-01) Permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date of the certification is made.

- D. For projects without a SWPPP, prior to commencement of the Work, the Contractor shall submit to the Architect/Engineer, in writing, an Environmental Plan. The plan must be prepared by a NYS licensed Professional Engineer. The Environmental Plan shall describe proposed methods and schedules for environmental protection, restoration, and erosion and sediment control. At a minimum, the Environmental Plan elements must conform to the requirements and procedures shown and specified, and to the NYSDEC and NYCDEP regulations. It shall describe the Contractor's compliance with the requirements and procedures, as well as modifications or additions necessitated by specific site conditions or construction/restoration schedules.

As a minimum, the Contractor's Environmental Plan shall contain:

1. The construction schedule including projected dates of clearing, construction, and restoration.
 2. A description of the sequence of operation and environmental precautions to be employed during construction of the site improvements.
 3. Erosion control measures to be implemented prior to completion of restoration.
 4. A drawing or series of drawings indicating width of the temporary work limits, extent of clearing and grubbing, location of stockpile and storage areas, location of hay bales and other erosion control devices, and placement of dewatering settlement basins (if required by project scope).
 5. Location of any disposal areas for excess excavated fill, subject to the approval of the Architect/Engineer. Disposal of materials shall be at approved and licensed landfills.
 6. Procedures for the preservation of existing vegetation, where practical, and restoration including, where appropriate, stone stabilization of stream banks and beds, fertilizing, seeding, and mulching, and soil stabilization matting such as jute netting.
- E. The Contractor shall revise and resubmit the Plan until it is approved by the Architect/Engineer.
- F. Material Submittals: Provide detailed material submittals, and as available, technical manufacturer's product data, for all items listed under 2.01 below.

PART 2 - MATERIALS

2.01 GENERAL

- A. Vegetated surface restoration products shall conform to the applicable requirements of Sections 02485 and 02801.
- B. Soil Erosion and Sediment Control Materials:
 - 1. **Silt fence** shall conform to NYSDOT Section 209-2.08 ("Soil Erosion & Sediment Control-Silt Fence") requirements. A silt fence assembly shall consist of silt fence geotextile fabric, jute mesh, burlap fabric, excelsior blankets, setting posts, and fasteners and may include mesh support/plastic netting consistent with the NYSDOT Standard. Note: Geotextile fabric, unless otherwise noted, shall meet the requirements of NYSDOT 207-2 Materials, Geotextile Stabilization, Strength Class 1.
 - 2. **Hay bales** shall be full size, unbroken and not rotted, and shall meet the requirements of NYDOT 209-2.04.
 - 3. **Gravel bags** shall be fabricated from reinforced woven geotextile and shall include ties. No burlap bags shall be allowed. Coarse aggregate shall meet the gradation requirements of size designation #1 or #2 of table 703-4 from NYSDOT specifications and shall be used as the fill material. Each gravel bag shall be individually tied and double bagged. The bag with fill material shall be inversely inserted into the second bag in order to prevent leaking.
 - 4. **Mulch** shall be straw or wood fiber mulch, and shall meet the requirements of NYSDOT 209-2.01.
 - 5. **Construction entrances** shall consist of a geotextile fabric, crushed stone, RCA or gravel and if necessary, a drainage pipe to maintain ditch flow.
 - i. Geotextile shall meet the requirements of NYSDOT 207-2 Materials, Geotextile Stabilization, Strength Class 1.
 - ii. Crushed Stone, RCA or Gravel shall be 150 mm of coarse aggregate material meeting the gradation requirements of size designation #3 on Table 703-4.
 - iii. The Contractor shall provide a drainage pipe sized with sufficient capacity to carry ditch flow.
 - iv. The construction entrance shall be maintained by the Contractor in a condition which will prevent tracking or flowing of sediment onto the right-of-way. All sediment spilled, dropped, washed, or tracked onto the right-of-way shall be removed immediately. In the event the entrance is no longer performing properly (i.e. the entrance aggregate

becomes clogged with sediment), the contractor shall top-dress the entrance with additional coarse aggregate material.

- C. Dust Control Materials: Water shall be potable and shall be obtained from an off-site source. Use of calcium chloride is prohibited.
- D. Temporary water for truck washdown and dust control shall be provided by and be the complete responsibility of the General Contractor. Tire wash locations shall be as indicated on Construction Implementation Plans; where not indicated, on CIP, the General Contractor shall supply his proposed location(s) for washdown and written methodology.
- E. Soil Stockpile Protection: Provide either 14 ga. geotextile silt fence fabric material, jute mesh, or soil erosion control blankets (similar or equal to *R-1 Excelsior Series* by *Western Landscape and Geotextile Supply Corp.*, 5065 Colorado Boulevard, Denver, Colorado, 80216 - ph. (720) 941-3833.

PART 3 - EXECUTION

3.01 PROHIBITED CONSTRUCTION PROCEDURES

- A. Prohibited construction procedures include, but are not limited to:
 - 1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or at unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, any wetlands, or any surface waters.
 - 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, or any wetlands.
 - 4. Damaging vegetation adjacent to or outside of the access road or the right-of-way.
 - 5. Disposal of trees, brush, and other debris in any stream corridors, any wetlands, any surface waters, or at unspecified locations.
 - 6. Permanent or unspecified alternation of the flow line of the stream.
 - 7. Open burning of project debris.
 - 8. Applying any pesticides, including defoliants, desiccants, and plant regulators, in any wetlands containing significant stands of high vigor spartina alterniflora (saltmarsh cordgrass), zizania aquatica (wild rice),

typhasp (cattail), and scirpus americanus (common threesquare).

9. Applying pesticides whose residues and metabolic products persist in the environment over extended periods of time.
10. Use of chemicals for dust control, including calcium chloride.
11. Use of asphaltic mulch binder.

3.02 EMERGENCY VEHICLE ACCESS

- A. The Prime Contract(s) shall provide temporary access to all Fire, Police, Ambulance, Hospital, or other emergency vehicles, where his construction procedures or activities directly impact the access to the Owner's facilities. Arrangements for temporary access shall be fully coordinated directly with the affected emergency department, the municipality which they serve and the Contractor.

3.03 CONSTRUCTION DETAILS

- A. Verify existing conditions prior to start of work each day. This is an active site that is in constant ongoing use. Control of dust, erosion and sediment is of extreme importance.
- B. Erect soil erosion and sediment control measures as shown on the plans, and at all locations of existing drainage along adjacent streets at all locations of existing on-site drainage, at newly installed drainage, along site driveways that are down-gradient from the items of work, and as directed by the Architect, Engineer and/or Construction Manager.
- C. Implementation and maintenance shall be acceptable to the NYSDEC Division of Water.
- D. Approved Silt Fence shall be erected at all locations where storm water flow will cause erosion. The more appropriate of manufacturer's instructions or plan details shall be followed in order that the installation perform in a satisfactory manner. Silt Fence shall only be removed after up-slope areas have been stabilized to avoid danger of washouts with deposition of soil and debris on adjacent areas.
- E. Approved Hay Bales or gravel bags shall be installed around all existing drainage structure castings on site and along adjacent streets that may be impacted by the Work, or as directed by the Engineer. Hay Bales shall only be removed after up-slope and up-gradient areas draining to the line of Hay Bales have been stabilized to avoid danger of washouts with deposition of soil and debris on adjacent areas.
- F. Approved Dust Control shall be performed on any day that dust

from the work site may be blown into any portion of the project site or onto any portion of the surrounding roads and property adjacent to the work site. In the event that dust from the Contractor's operations becomes built-up off of the work site in any quantity, and at any location noted herein, the Contractor shall be required to take actions to correct this condition.

- G. The Contractor shall install a Stabilized Construction Exit Pad (see detail and location on the plans, or in accordance with standard construction practice and as located on site via start of work. Location to be coordinated with the Owner's Representative. The Contractor shall be responsible for insuring that all vehicles exiting the site cross over the Exit Pad in an effort to prevent soil and other debris from the site from being deposited on off-site roadways. The Contractor shall be responsible for maintaining the efficiency of the Pad stone such that it accomplishes the task intended. In the event that crossing over the Exit Pad alone does not remove soil and debris from the vehicles, the Contractor shall provide equipment, personnel, etc., as needed, to wash the soil and debris from the vehicles using water.

3.04 SITE ACCESS AND CLEARING

- A. Extent of Clearing and Grubbing: The Contractor shall confine all clearing and grubbing to that portion of the work limits absolutely essential for the construction and installation of the structures and appurtenances, particularly in the vicinity of stream corridors, surface waters, mature trees and steep slopes.
- B. Schedule of Clearing: All clearing schedules shall be arranged to provide a minimum practical exposure (in both extent and duration) of soils in order to prevent erosion. As much of the ground cover root structure as is practical shall be left in place to minimize the length of right-of-way or work limit in which construction will be initiated within ten working days.

3.05 STOCKPILING OF MATERIAL

- A. After vegetation has been removed, the Contractor shall strip any topsoil from the area to be excavated and stockpile it for future use. At the completion of the work, the Contractor shall legally remove all excess fill from the site at his own cost.
- B. When excavating trenches, the Contractor shall separate suitable backfill material from unsuitable material for use as backfill.
- C. Items A & B above shall be done in conjunction with work conducted under 02200 - "Earthwork".
- C. Where topsoil or subgrade material is to be stored, a suitable means of protecting excavated material from wind and water erosion shall be employed. Erosion control methods may include

one or more of the following: mulching, sprinkling, silt fencing, hay bales or erosion blankets.

3.06 PROTECTION OF TREES AND SHRUBS

- A. The Contractor shall make every effort not to damage adjoining trees and shrubs, other than those he is permitted to cut, within or adjacent to the line of the excavation.

3.07 DEWATERING

- A. Turbid water pumped from excavations or working or processing water containing oils or sediments shall be diverted to sediment traps shown in drawings prior to discharge. Extra caution shall be taken when discharge may be directed towards any surface water, stream corridor or wetland area.

3.08 EROSION CONTROL

- A. The Contractor shall use necessary methods to minimize erosion within working limits and access roads. Methods of preventing erosion shall include the use of hay bales, silt fence, sediment traps, filter fabric, mulch, and jute or excelsior blankets, as conditions require. Erosion and sediment control methods shall be employed during site clearing, construction, immediately following clearing and backfilling and at the time of final restoration.
- B. All erosion and sediment control practices shall be in place until construction is completed and/or the area is stabilized.
- C. The Contractor shall provide special attention to areas where slopes are 15 percent or greater. In general, staked hay bales shall be used to minimize erosion on slopes. In steeper areas, staked hay bales and filter fabric shall be used downslope from construction. Jute netting or other means of protection shall be used on exposed slopes until vegetation or other permanent restoration measures are in place.
- D. Minimum hay bales, silt fence, sediment traps installation requirements may be shown on the Drawings; if not shown, they shall be provided in accordance with design standards and standard construction practice.

3.09 NOISE CONTROL

- A. Noise levels occurring during sediment and erosion control work shall not exceed limits specified by local and state regulations.

3.10 SEDIMENT & EROSION/SEDIMENTATION CONTROL

- A. Erosion Control Measures shall include the following:

1. The proposed erosion control shown on the plans shall be installed prior to the start of construction. Additional erosion control may be necessary, based upon field conditions that may develop as construction progresses, and as may be required by the local conditions.
 - a. Existing vegetation to remain shall be protected and remain undisturbed.
 - b. Clearing and grading shall be scheduled so as to minimize the size of exposed areas and length of time that areas are exposed.
 - c. The length and steepness of cleared slopes shall be minimized to reduce runoff velocities and quantities.
 - d. Runoff shall be diverted away from clear slopes.
 - e. Sediment shall be trapped on-site.

Specific methods and materials employed in the installation and maintenance of erosion control measures shall conform to the *New York State Guidelines for Urban Erosion and Sedimentation Control*.

2. Sedimentation barriers (silt fence, hay bales, or approved equal) shall be installed prior to any grading work along the limits of disturbances and shall be maintained for the duration of the work. No sediment from the site shall be permitted to wash onto adjacent properties or roads. Where sedimentation barriers are required adjacent to streams, ponds or tidal areas, the silt fence is to be supported by a temporary metal post and chain link fence.
3. Graded and stripped areas and stockpiles shall be kept stabilized through the use of temporary seeding or sod as required.
4. Seed mixtures shall be in accordance with the Soil Conservation Service recommendations.
5. Soils stockpiled on individual lot as a result of excavation for foundations shall be placed to increase the distance these soils must travel to reach the drainage system.
6. Drainage inlets installed as part of the project shall be protected from sediment buildup through the use of sedimentation barriers, sediment traps, etc. as required.
7. Proper maintenance of erosion control measures is to be performed as indicated by the periodic inspection after a rainfall event totaling 0.5 inches of rainfall or greater or during a 14-day inspection program occurring throughout the

period of the construction. Maintenance measures include, but are not limited to, cleaning of sediment basins or traps, cleaning and repair of berms and diversions and cleaning and repair of inlet protection.

8. Appropriate means shall be used to control dust during construction. A stabilized construction entrance shall be maintained to prevent soil and loose debris from being tracked onto local roads. In addition, a water source is to be maintained adjacent to this entrance for the purpose of washing debris from truck tires. The construction entrance shall be maintained until the site is permanently stabilized.
9. Sediment barriers and other erosion control measures shall remain in place until upland disturbed areas are permanently stabilized.
10. All 1:2 and 1:3 slope areas will be protected against erosion during construction and permanent ground cover shall be such that erosion will be prevented. Necessary measures shall include, but not be limited to, hay bales, silt fence, silt trap/basins, jute mesh, anchored straw mulch, hydroseeding, sod, etc. and shall be maintained for the duration of the construction as well as following the completion of construction until such time that the proposed plantings have become acclimated/established as determined by the authority having jurisdiction.

The plans shall also address the following environmental issues the Contractor shall be responsible for addressing during construction:

1. Pollution prevention measures to be instituted to prevent litter, construction chemicals, and construction debris from becoming pollutant sources in storm water discharges from the site.
2. Provide a description of the method of storing waste materials on-site and a description of controls to be employed to reduce pollutants from these materials, including storage practices to minimize exposure of materials to storm water with a spill prevention and response plan.
3. The installation of a portable sanitary system or a system established in a field office trailer is to be maintained through the term of the project.
4. All soils stockpiled on the site for future use shall be covered to limit dust pollution and run-off of fines with rain.
5. Site clearing wood chips to be stockpiled for mulch shall be stockpiled in an area away from proposed construction and surrounded by silt fencing.

6. The Contractor shall be responsible for keeping adjacent roadways free of debris washed from the construction site. A street sweeper shall be employed to remove all soil and debris from roadways as often as may be required.
7. All construction debris shall be removed from the site within the same day, or kept in a manner to prevent it from leaving the site with storm runoff or blown from the site by winds.
8. All refuse shall be placed within a covered container for future disposal.
9. The Contractor shall be responsible for the disposal of all excess concrete dumped on the site. Furthermore, the Contractor shall designate a location for washing delivery trucks. This area is to be configured to insure that wash water does not runoff the site to either private property or public roadways. Subsequent to the completion of concrete activities, this area is to be excavated and material to be removed from the site. Suitable soils are to be brought to restore this area.
10. The Contractor shall be responsible for installing catch basin inserts into any and all County-owned catch basins connected to positive drainage systems, which are located adjacent to the project area or located within 100' of the project area. It is the responsibility of the Contractor to maintain these inserts during the period of the construction in accordance with the manufacturer's recommendation. At the end of all site work, including the development of individual sites, new media is to be installed and the devices are to be dedicated to the County. All structures are required to have an 80% Total Suspended Solids Removal or as may be specified in the New York State Design Manual. However, if it is determined that the catch basins lying within these limits do not connect to positive systems, and function solely as leaching basins, the Contractor will be responsible for cleaning each at the conclusion of all site work. This does not prevent the County from issuing a request to clean these facilities if it has been determined that the Contractor's activities have adversely affected their normal function.

B. Sequence of Construction Activities:

Install silt fence, sediment traps, and hay bale filters as a part of initial phase of work to ensure maximum silt retention on site.

Mass grade the site, keeping disturbed areas to a minimum at all times. Seed and mulch sides of swales, mounds and ponds, immediately upon completion.

Control mud accumulation on all streets surrounding the project site by installing stone surface at each location where construction traffic leaves the site. Keep dust to a minimum, by utilizing sprinkling, vegetative cover, spray-on adhesives, or other approved methods.

Maintain all filters and traps during construction to prevent any blockages from accumulated sediment. Clean sediment traps, filters and fencing after each storm event as well as on a weekly basis. Replace all materials that are clogged or ineffective.

Remove temporary erosion control and sediment controls only when sufficient growth of ground cover is established to prevent further erosion.

B. Monitoring:

1. Monitor soil erosion practices at least weekly to determine the effectiveness of the installation and any repairs which may be required. Keep a detailed log of these observations and remedies taken.
2. Clean out siltation filters when siltation reduces capacity by 20 percent. Material removed may be dried and used as embankment material only, in areas approved by the Architect/Engineer.

3.11 DUST CONTROL

- A. Dust control shall be achieved by wetting, sweeping, and temporary mulching. *The use of chemicals for dust control, including calcium chloride, will not be permitted.*

3.12 STABILIZATION

- A. The Contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:
1. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable;
 2. Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

3.13 MULCHING

- A. Where slopes exceed 15 percent or as directed by the Architect/Engineer, mulch in the form of staked jute netting or other material approved by the Architect/Engineer must be installed and maintained until an adequate vegetative cover is established.

3.14 FILL MATERIALS

- A. All fill materials shall be stockpiled away from wetland areas and water bodies and surrounded with an overlapping, anchored hay bale barrier.

3.15 SILT DISPOSAL

- A. All silt that has accumulated behind hay bale barriers or silt fences shall be removed from the site after it has had sufficient time to dry, and before the hay bales or fences are removed.

3.16 INSPECTION REQUIREMENTS (FOR PROJECTS REQUIRING A SWPPP)

- A. Soil erosion and sediment control shall be inspected by a Civil Engineering firm retained independently by the Owner specifically for soil erosion control inspection and all controls shall be maintained during the life of the project, including winter shutdown, etc. Such inspection and maintenance shall continue until after project is complete.
- C. All inspections shall be completed within one calendar day. Inspection reports shall be issued within 5 working days from day of inspection. Within 3 calendar days after receipt of the inspection reports, the Contractor shall:
 - Repair or rebuild the control measures to function as originally intended.
 - Remove sediment deposition which reached one half the height of the control measure. All sediment deposits shall be considered unsuitable material and disposed of in accordance with NYSDOT Spec. 203-3.08, Disposal of Surplus Excavated Materials. Material shall be disposed of away from wetland, water courses or other bodies of water.
 - Torn or punctured silt fence fabric may be repaired by the placement of a patch, on the upstream side, consisting of an additional layer of fabric over the damaged area, or replacement of the damaged section.
- C. Site inspections shall be conducted by a Civil Engineering firm retained by the Owner specifically for soil erosion control inspection at least every seven (7) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. During each inspection, the following information shall be recorded:

1. On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
 2. Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization.
 3. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period.
 4. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume (for example, 10 percent, 20 percent, 50 percent).
 5. Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water.
 6. The Contractor shall correct all deficiencies that are identified with the implementation of the Stormwater Pollution Prevention Plan.
- B. The Contractor shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the Contractor shall certify in the site log book that the Stormwater Pollution Prevention Plan meets all Federal, State and local erosion and sediment control requirements.

The Contractor shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

3.17 SYSTEM MAINTENANCE (FOR PROJECTS THAT DO NOT REQUIRE A SWPPP)

- A. The Contractor shall conduct regular and routine inspections of the installation and erosion control measures throughout the progression of the work, supplementing and restoring site conditions as necessary to maintain the site.

3.18 SYSTEM REMOVAL AND SITE RESTORATION

- A. Restoration Area: All surfaces which have been disturbed or damaged by the Contractor's operations, including streambanks,

slopes, dewatering, stockpiling, and equipment storage areas, shall be restored to the condition at least equal to that in which they were found immediately prior to the beginning of construction, or improved as indicated in the Contract Documents. Suitable materials and methods shall be used for such restoration. Grass shall be re-seeded with types compatible with particular areas involved and in conformance with Section 02801. The Contractor shall restore all damaged surfaces outside the work limits.

- B. Restoration Schedule: Permanent restoration of vegetative cover shall be initiated only during optimal planting seasons as delineated in Section 02801. At other times, temporary restoration measures shall be implemented and followed by permanent restoration when the first optimal planting season occurs.
- C. Restoration of vegetation shall be in conformance with Sections 02425 and 02801.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02400 - STORM WATER DRAINAGE, STRUCTURES AND CASTINGS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The work of this section is subject to all applicable provisions of the "General Conditions" and "Supplementary General Conditions", which form a part hereof whether attached hereto or not.
- B. Work Included: Furnish labor, materials, equipment, and appurtenances required to perform all work including, but not limited to, the following:
 - 1. Provision and installation of precast catch basins, leaching basins, and other drainage structures where indicated on the drawings.
 - 2. Provision and installation of drainage piping.

1.02 REFERENCE STANDARDS

- A. All applicable ASTM Specifications, NYSDOT and AASHTO standards, latest editions, shall apply.

1.03 RELATED SECTIONS

- A. Section 02000 - Sitework General Provisions
- B. Section 02200 - Earthwork
- C. Section 02270 - Sediment & Erosion Control Procedures and Requirements
- D. Storm Water Pollution Prevention Plan, if applicable.
- E. If this is a LEED project, the work must comply with the requirements of the following related specifications sections:
 - 1. Division 1 Section "LEED Requirements" for additional LEED requirements.
 - 2. Division 1 Section "Construction Waste Management" for recycling construction waste.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in ample time to facilitate the work as under this section.
- B. Store and handle materials in accordance with manufacturer's recommendations.

1.05 SUBMITTALS FOR REVIEW

- A. Submittals shall be in accordance with Section 01300.
- B. Product Data: Submit manufacturer's specifications and product data for all materials specified herein. Obtain approval from the Architect before materials are ordered from the manufacturer.
- C. Shop Drawings: Submit shop drawings or distributor's information to the Architect for approval of the following:
 - 1. Precast concrete drainage structures.
 - 2. Perforated and non-perforated corrugated polyethylene pipe and fittings.
 - 3. Cast iron frames & grates/covers and combination curb box inlets.
 - 4. Filter fabric.
- D. LEED Submittals (if applicable): Submit recycled content and regional materials documentation for each type of product provided under work of this section in accordance with section 01352 - LEED Requirements.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND DISTRIBUTORS

- A. Precast concrete structures and products shall be as manufactured by AFCO Precast Corp., Coastal Pipeline Corp., Pelkowski Precast, Corp. or approved equal.
- B. Corrugated polyethylene pipe (CPP) and fittings shall be "N-12" with smooth interior walls as manufactured by Advanced Drainage Systems, Inc. (ADS), 3300 Riverside Drive, Columbus, Ohio, 43221,(614) 457-3051, or approved equal.
- C. Cast iron frames & grates/covers and combination curb box inlets shall be as manufactured by Campbell Foundry Co., Harrison, New Jersey; Neenah Foundry Co., Neenah, Wisconsin; or approved equal.
- D. Filter fabric shall be Carthage Mills FX-400 HS or approved equal.
- E. All structures/products shall meet AASHTO H-20 loading unless otherwise specified on the drawings.

2.02 PRECAST CONCRETE PRODUCTS

- A. Strength: 4,000 psi @ 28 days.
- B. Cement: ASTM C-150.
- C. Aggregates: ASTM C-33.

- D. Water: Pure and potable.
- E. Reinforcement: ASTM A-615.
- F. Welded Wire Fabric: ASTM A-185.

2.03 CORRUGATED POLYETHYLENE PIPING (CPP)

- A. Piping products shall meet the requirements of ASTM D-3350 and AASHTO M-252 or M-294, latest edition.
- B. Pipe shall be provided with couplings, elbows, and other connections to maintain alignment and insure tight flexible joints. The materials shall be of the same composition as the pipe. Unless otherwise noted, provide soil-tight joints of either bell & spigot configuration or split-couplers.
- C. Each length of pipe shall be marked with the manufacturer's trade name, class, type, size, and date of manufacture.
- D. Diameter and size of piping shall be as indicated on the drawings.

2.04 CAST IRON FRAMES AND GRATES

- A. All cast-iron frames & grates/covers, and combination curb box inlets shall meet the requirements for casting M6A - Steel Castings, Grade N-i; or M8 Iron Castings, Class No. 30; or M 13 - Malleable Iron Castings, Grade 32501 at the Contractor's option.
- B. Grates located in plazas, sidewalks, roadways at drop curbs, or other area of pedestrian activity, shall be ADA compliant.
- C. Round manhole frames & covers/grates shall be 22" diameter, unless otherwise noted or shown on the drawings.
- D. Rectangular inlet frames & grates shall be 24"x36", unless otherwise noted or shown on the drawings.
- E. Frames, grates, and covers that are warped or rock in the opinion of the Architect will be rejected and removed from the site.

2.05 BRICK CHIMNEY

- A. Comply with the ASTM Standard Specifications for Sewer Brick, designated C32-58, for Grade 5A, hard brick, except that the mean of five tests for absorption shall not exceed eight percent weight.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install shoring, sheet piling, or other acceptable excavation stabilization as required by OSHA or other agencies having jurisdiction, or as required by proximity to existing site features.

- B. Sides of holes and trenches shall be near vertical as possible. Bracing or sheeting shall not be removed until the proper level of backfill has been reached.
- C. Under no circumstances shall the materials of this section be laid in water.
- D. Excavation shall be by open cut from the surface. Leaching holes shall be approximately 3'-0" wider than the outside diameter of section to be installed. Leaching rings and piping shall be set on undisturbed earth. Any and all excess excavation shall be backfilled and thoroughly compacted.
- E. After the area to be occupied by each structure has been excavated of all deleterious and impervious materials and acceptable, clean sand and gravel has been encountered, set structures, wrap in filter fabric, and then backfill per item G.
- F. All unused pipe knock outs in precast walls must be bricked or concreted to provide full wall thickness.
- G. Backfill around drainage inlets and drywells shall be placed on all sides simultaneously and shall be unified soil classification type GW or GP. Native soils not meeting this classification shall not be utilized for backfill unless specifically approved by the Architect. Additional backfilling beyond or above the 3'-0" collar shall be done with coarse sand, fine gravel, loam, clean earth, or other excavated materials, free from stones and foreign matter. Backfilling shall be done in accordance with Section 02200 - Earthwork.
- H. Piping Installation:
 - 1. Installation shall be in accordance with ASTM Recommended Practice D2321, or as shown on the drawings and specified herein. Refer to specification section 02200 - Earthwork for trenching and bedding material specifications.
 - 2. Width of pipe trenches shall be kept to a minimum, while providing adequate space for workmen to place and joint the pipes properly. In no case shall the width of trench be more than 18 inches greater than the diameter of the pipe measured at bell. Trenching practice shall be in accordance with ASTM D2321 and AASHTO Section 30.
 - 3. Install pipe true to designed line and grade, adjusting bedding as required.
 - 4. For bell & spigot joints, install with bells facing upstream. Wood blocking should be utilized to prevent damage during seating of connections.
 - 5. Backfill with approved material from bedding to 12 inches over the pipe in 6 inch layers, thoroughly compacting around the pipe with hand and/or mechanical tamping devices. Backfill evenly on each side of pipe to assure there is no shifting of alignment. From 12 inches over pipe to subgrade, backfill with excavated native material, but allow no trash, debris, or stones to be

incorporated in backfill.

6. In all locations where pipes are under paved areas, backfill with approved material from bedding to subgrade in 6-inch layers, thoroughly compacting around the pipe with hand and/or mechanical tamping devices. Backfill evenly on each side of pipe to assure there is no shifting of alignment.
7. Openings in structures cut for piping shall be no larger than 4" greater than outside pipe dimension. Grout full thickness of drainage structure wall at piping.
8. Piping shall protrude from inside face of structure a minimum of 2" and a maximum of 8".
- I. Frames and grates shall be set so that the top of the frame will be flush with finished grade. Frames shall be set in a full bed of stiff mortar with a minimum of three (3) courses of brick and mortar.
- J. After backfilling, provide sufficient stakes, flags, etc. to outline the drainage inlets, drywells, and/or piping to prevent disturbance by the use of trucks and heavy equipment.
- K. All drainage structures and piping shall be protected and thoroughly cleaned at the completion of the project by the Contractor. Any defacements shall be corrected or replaced as directed by the Architect, without additional cost to the Owner.
- L. All existing cast iron covers located within the area of new work shall be adjusted to finished grade.

3.02 SITE RESTORATION AND CLEAN UP

- A. The Contractor shall clean up and legally remove from the sites all rubbish and surplus material as it accumulates and shall not permit it to be scattered around the project sites.
 1. If this is a LEED project, disposal must comply with Division 1 Section "Construction Waste Management" for recycling construction waste.
- B. The Contractor shall restore all areas of the site affected by the work to its original condition, inclusive of pavements, topsoil and grass, plantings or other ground cover.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02452 - GROUNDS, TRAFFIC & PARKING SIGNS



PART 1 - GENERAL

1.01 DESCRIPTION

- A. Under this item, the Contractor shall furnish and install signs at locations indicated in the Contract Documents or directed by the Architect including all required operations specified.
- B. This work shall consist of fabricating, installing and covering grounds traffic and parking sign panels, sign support systems, and sign posts in accordance with the Contract Documents, standard sheets, the Manual on Uniform Traffic Control Devices (MUTCD) and as directed by the Engineer.
- C. These specifications are intended to meet the 2008 N.Y.S D.O.T. standards specifications in U.S. Edition Section 403. It can be found at:
www.nysdot.gov/main/businesscenter/engineering/specificationsupdated-standard-specifications-us.
- D. GC shall be responsible for all N.Y.S D.O.T. specification sections referred to herein or referred to within related specification sections found on the N.Y.S D.O.T. website.
- E. The work must comply with the requirements of the following related specifications sections when applicable:
 - 1. Division 2 Section 02000 - "Sitetwork/ General Provisions"
 - 2. Division 2 Section 02200 - "Earthwork"
 - 3. Division 2 Section 02600 - "Asphalt Paving"
 - 4. Division 2 Section 02801 - "Topsoil, Lawns and Grasses"

1.02 SUBMISSIONS

- A. In accordance with Section 01300 the Contractor shall provide shop drawings and product data. Contractor shall furnish and be responsible for all dimensions not given, such as post lengths, which are required in conjunction with layout for construction.
- B. Submit manufacturer's product data.
- C. Samples
- D. Shop Drawings

PART 2 - MATERIALS

2.01 GENERAL

- A. Materials shall meet the requirements of the following subsections of N.Y.S D.O.T. Section 700 *Materials and Manufacturing*:

1.	Stainless Steel Connecting Products	715-16
3.	Aluminum Sign Panels	730-01
4.	Reflective Sheeting	730-05
5.	Reflectorized Sheeting Sign Characters (Type IV)	730-12
6.	Reflectorized Sheeting Sign Characters (Type V)	730-13
7.	Stiffeners, Overhead Brackets, and Misc. Hardware	730-22
8.	Type A Sign Supports	730-24
9.	U-Bolts	ASTM F1554, Grade 36

2.02 SIGN PANELS

A. Fabrication of all components shall produce a finished sign panel. Holes may be punched or drilled. Edges shall be smooth and true and free from burrs or ragged breaks. Sign panels shall be fabricated as shown on the standard sheets. Details for signs that are not shown on the standard sheets shall be similar to the closets shown sign blank size. All sign panels shall be clearly marked in the lower right corner on the back of the sign panel to show the Contract Number and the installation date (month/year). Markings shall be a minimum of 1 inch high and shall be permanently engraved, labels attached with pressure-sensitive adhesives, marked with an indelible ink or paint, or established by another method approved by the Engineer. U-Bolts used to attach sign panels to overhead sign structures shall be Type II galvanized in accordance with N.Y.S D.O.T. §719-01 *Galvanized Coatings and Repair Methods*.

B. Ground-Mounted Sign Panels

1. Ground-Mounted Sign Panels without Z-bars
 - a. Ground-Mounted signs without Z-bars shall be 10 gauge thick meeting the requirements of N.Y.S D.O.T. §730-23 *Fiberglass Reinforced Plastic Sign Panels* for sign panels up to 4 feet x 4 feet.
2. Ground-Mounted Sign Panels less than or equal to 30 square feet (with Z-bars)
 - a. Ground-mounted signs with Z-bars less than or equal to 30 square feet shall be 10 gauge thick meeting the requirements of N.Y.S D.O.T. §730-01 *Aluminum Sign Panels* or 0.132 inch thick, meeting the requirements of N.Y.S D.O.T. §730-23 *Fiberglass Reinforced Plastic Sign Panels* for sign panels up to 4 feet x 4 feet.
3. Ground-Mounted Sign Panels greater than 30 square feet (with Z-bars)
 - a. Sign panels for Ground-Mounted Sign Panels greater than 30 square feet shall be 8 gauge thick meeting the requirements of N.Y.S D.O.T. §730-01 *Aluminum Sign Panels*.

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C. Sign Panels with Multiple Sheeting types

1. The panel thickness for sign panels with multiple types of sheeting types shall be determined using the total area of the sign panel, and meet the materials requirement above.

D. Reflective Sheeting

1. Reflective sheeting materials used on sign panels shall conform to the requirements of N.Y.S D.O.T. §730-05 *Reflective Sheeting*. Type I (Class A) sheeting may be used on tourist and motorist services signs. Type III (Class B) sheeting shall be used on regulatory, warning, route marker, and guidance signs unless specified otherwise below.
2. Type I (Class A) sheeting shall be used whenever brown reflective sheeting is specified, and may be processed by a sign fabricator in its shop. The legend for with brown background shall be made by applying letters or symbols of Type I (Class A) yellow

a sign
cut-out
sheeting.

a. High-Visibility Sheeting

1. Signs with the following MUTCD codes shall be fabricated using Type IX (Class E) sheeting: R1-1, R1-2, R1-4, R1-5, R3-1, R3-2, R3-4, R3-18, R5-1 and R5-1a.

b. High-Visibility Fluorescent Yellow Sheeting

1. Sign with the following MUTCD codes shall be fabricated using Type IX (Class E) fluorescent yellow sheeting for the yellow portion of the sign face, and the appropriate non-fluorescent Type IX (Class E) color for the remainder of the sign face: E11-1, E11-1a, E11-1b, E11-1c, W1-7 and W1-8.

c. High-Visibility Fluorescent Yellow-Green Sheeting

1. Signs with the following MUTCD codes shall also be fabricated using Type IX (Class E) fluorescent yellow-green sheeting for the yellow portion of the sign face, and the appropriate non-fluorescent Type IX (Class E) color for the remainder of the sign face: NYR2-7, NYR2-8, S1-1, S3-1, S4-3, S4-5, W11-1, W11-1, W11-9, W15-1, W16-1 and 16-7p. In addition, signs with the following MUTCD codes mounted on the same support system shall also be fabricated using Type IX (Class E) fluorescent yellow-green sheeting for the yellow portion of the sign

face, and the appropriate non-fluorescent Type IX (Class E) color for the remainder of the sign face: W16-2, W16-2a, W16-3, W16-3a, W16-4 and W16-9p.

E. Sheeting Sign Characters

1. Characters include letters, numerals, route shields, symbols and borders. Characters shall be the size, series and color specified in the MUTCD and as specified in the Contract Documents Only Type IV or Type V Characters, as appropriate, shall be used. White legends and borders shall be formed with directly-applied Type IV Characters. Interstate shields for signs shall be either demountable panels or directly-applied panels with Type V reverse-screened characters. Sign face characters and background shall be reflective, but black portions of a sign face shall not be reflective.

F. Sign Face Layouts

1. Sign face shape, color, dimensions, and characters shall be in accordance with:
 - a. Manual of Uniform Traffic Control Devices for streets and highways (FHWA).
 - b. New York State Supplement to the National Manual on Uniform Traffic Control Devices for Streets and Highways.
 - c. Standard Highway Signs Book - (FHWA)

After Contract award, two copies of non-standard sign face layouts will be provided to the Contractor. The Contractor shall verify dimensions on the sign face layouts prior to fabrication. (Standard sign face layouts for MUTCD codes without the prefix NY are shown in the Standard Highway Signs Book written by the Federal Highway Administration).

2.03 TYPE A SIGN POSTS

- A. Sign posts shall be galvanized steel U-channel of not less than 3.0 lbs./ft. and shall meet the New York State Department of Transportation requirements for structural steel and ASTM Specification B308 and 6061-T6. The standard strength (i.e., moment capacity) of a Type A sign post shall be 2100 ft-lbs, although weaker or stronger posts may be substituted when permitted.
 1. Type A Sign Posts with Extra Embedment, as indicated on drawings.
 - a. Type A sign posts with extra embedment (more than 3 feet) shall meet the requirements of the NYS DOT Materials Details for Type A sign supports.

2. Soil Plates for Type A Sign Posts, as indicated on drawings.
 - a. Type A sign posts with soil plates shall meet the requirements of the Materials Details for Type A Sign Supports.
3. High-Capacity Type A Sign Posts, as indicated on drawings.
 - a. High-Capacity Type A sign post are defined as any Type A sign post system shown in the NYS DOT Materials Details for Type A Sign Supports that has a total combined capacity for the entire two- or three-post system higher than 7800 ft-lbs. The Contractor shall calculate the design moment of the sign panel, and select an appropriate High-Capacity Type A sign post system capable of resisting that moment, subject to the Engineer's/ Architect's approval.

PART 3 - EXECUTION

3.01 PROCEDURE

- A. Signs shall be located 7 feet above grade (to bottom of sign) at locations shown on the plans except where indicated otherwise.
- B. All signs shall be erected truly vertical.

3.02 GENERAL

- A. Sign panels, overhead panels, overhead vertical brackets, vertical and horizontal Z-bars, sign support systems, sign posts, breakaway bases and hinge assemblies, shall be constructed in accordance with the Contract Documents, NYSDOT standard sheets, MUTCD and material details. Sign locations shown in the Contract Documents are approximate, and the exact location for each sign will be approved by the Architect/Engineer.
- B. The Contractor shall erect new signs and remove existing signs in such a manner that the traveling public is provided all necessary regulatory, warning, and guidance information at all times. Certain items may be designed to be performed prior to other work items.
- C. An inspection of installed signs will be made in the daylight for color, reflectivity, location, vertical post alignment, visibility and appearance. The installed signs may also be inspected at night for color, orientation and reflectivity, traits which will be more than conspicuous at night.
- D. Wind Loads
 1. The wind pressures given on the standard sheets have been calculated according to the procedure in the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and traffic Signals (latest edition)*. All wind

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loading shall be adjusted for height, drag, and gusting in accordance with AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and traffic Signals* (latest edition). Allowable sign areas shall be reduced when the sign centroid height is at an elevated site condition (e.g., an overpass) where the influence of the ground on the wind is reduced. For example, a sign centroid between 29 feet and 49 feet above the existing ground would result in a 37.5% increase in wind pressure (refer to section "Loads" in aforementioned AASHTO Specifications).

TABLE 645-1 WIND LOAD CRITERIA				
	Region	Wind Velocity (mph)	Wind Pressure at Panel ≤ 140 14.0 ft (psf)	Wind Pressure at Panel ≥ 140 14.0 ft (psf)
Type A Post	1, 2, 6, 8, and 9	60	14.4	19.2
	3, 4, 5, 7, 10 and 11	70	20.4	25.2

NOTE: Panel centroid height measured above the surrounding terrain.

3.03 SIGN PANELS

- A. Sign panels shall be installed as shown on the standard sheets or as shown in the Contract Documents. Layout of sign panels and assemblies shall be as shown in the Contract Documents.

3.04 TYPE A SIGN POSTS

- A. The Contractor shall install Type A sign posts individually or in groups to provide the requirement moment resistance. Type A sign posts with Extra Embedment, and Soil Plates for Type A sign post shall be installed where extra embedment depth and/or soil plates are required. High Capacity Type A sign posts shall also be installed where extra moment capacity is required.
- B. The number of Type A sign posts indicated in the Contract Documents is based on the information available during design. The number and strength of Type A sign posts installed shall be based on conditions at the final sign location approved by the Engineer. The Contractor shall determine the required moment resistance for the Type A sign post(s) due to the wind loads indicated in N.Y.S D.O.T. §645-3.01A.
- C. *Wind Loads*, and propose an appropriate number and strength of Type A sign posts for the approval of the Engineer. The Contractor shall submit approved Materials Details, and any computations, to the Engineer, and install the required number of Type A sign posts subject to the following criteria:
 - 1. For signs with a nominal width greater than 30 inches, at least two posts are required, except that the nominal 30 inch x 30 inch diamond panel and the nominal 36 inch wide "YIELD" panel require only one post.

2. The maximum number of posts installed within a 7 foot path shall be as described on the approved materials list.
3. For single flanged channel post installations only, the required moment resistance for the post shall be increased by 25% to account for torsional shear. The materials details include this adjustment.

3.05 CONCRETE FOUNDATIONS

- A. Concrete foundations shall be constructed in accordance with the details shown on the drawings and in accordance with Division 3 Concrete Specifications. Upon completion of the sign installation the Contractor shall restore the area to its original state.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02504 - CLEANING EXISTING STORM WATER DRAINAGE SYSTEMS

PART 1 - GENERAL

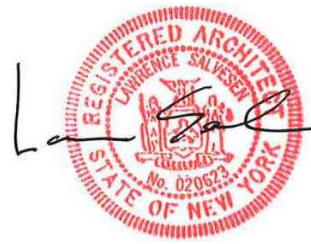
1.01 DESCRIPTION

- A. Under this work, the Contractor shall clean existing catch basins, manholes, drop inlets, leaching basins, storm drains, and culverts as indicated on the plans and/or as directed by the Engineer.

1.02 CONSTRUCTION DETAILS

- A. All drainage system components which lie within the construction area shall be cleaned of silt and debris in a workmanlike manner and maintained clean as determined by the Engineer for the duration of the contract. Material removed from the culverts shall be disposed of off the contract limits. The Contractor shall execute care for and protect all trees, fences, and drainage system components within, or adjacent to, the work site. The Contractor shall replace in kind any system components or other facilities damaged by his operation at his own expense.

END OF SECTION



DIVISION 2 - SITE WORK

SECTION 02577 - PAVEMENT MARKING (TRAFFIC PAINT)

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Under this work, the Contractor shall furnish and apply pavement marking paint at locations in accordance with the patterns indicated on the plans or as directed by the Architect, and in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and these specifications.
- B. This work shall also include the cleaning and preparation of pavement surfaces and the maintenance and protection of traffic markings during marking operations.

1.02 REFERENCE STANDARDS

- A. New York State Department of Transportation (NYSDOT)
- B. Manual on Uniform Traffic Control Devices (MUTCD)
- C. New York State Department of Environmental Conservation (NYSDEC)
- D. United States Environmental Protection Agency (USEPA)

1.03 RELATED SECTIONS

- A. 02600 - Hot Mix Asphalt Pavement System
- B. 02603 - Asphalt Repair, Sealing, Cleaning and Preparation

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 01300 - Submissions, and as modified below.
- B. Contractor shall submit manufacturer's product data and color samples for every type of paint that is being used. Data shall include application rate, product characteristics, performance characteristics, composition information and product description.
- C. For each paint being used, submit material safety data sheets.

PART 2 - MATERIALS

2.01 MATERIALS

- A. For purposes of establishing a standard of quality, traffic paint shall be Sherwin-Williams Company Baltimore, MD TM2174 (white) or TM 2196 (white), TM2317 (yellow) or TM2197 (yellow) and TM2133 (blue), or Architect approved equal. Any paint on the NYSDOT approved list for pavement marking materials may be permitted as an equivalent with Architects approval.

- B. All paints shall conform to Federal, State, and local air pollution regulations including those for the control (emission) of volatile organic compounds (VOC) as established by the USEPA and the NYSDEC.

PART 3 - EXECUTION

3.01 APPLICATION CONDITIONS

- A. At the time of paint application, the pavement surface and ambient temperature shall not be less than 50°F, the relative humidity shall not exceed 85% and the pavement surface shall be cured and dry.
- B. Traffic paint shall not be applied during periods of rain or if the rain is imminent. Waterborne traffic paint shall not be applied if rain is expected within 4 hours after application.
- C. Paint shall be applied in strict accordance with the manufacturer's recommendations for use. In no case shall the paint be heated above 150°F.
- D. The Contractor shall be responsible for cleaning the pavement of dust, dirt and other foreign material which may be detrimental to the adhesion of the paint film in accordance with the manufacturer's requirements and to the satisfaction of the Owner and Architect.

3.02 APPLICATION

- A. All pavement markings and patterns shall be applied in accordance with manufacturer's instructions and placed as shown in the Contract Documents. Installation shall also be in accordance with the MUTCD and the NYS Uniform Code and shall be as follows:
 - 1. Parking stall stripes shall be 4" wide white except handicapped stalls and access aisles which shall be 4" wide blue.
 - a. Uniform symbol of accessibility shall be blue.
 - b. Hatching for handicap access aisles shall be 8" wide blue and set 3ft. on center.
 - c. Hatching for other non-handicap areas as shown on the plans shall be 8" wide white and set at 3ft. on center.
 - 2. Crosswalks shall have 8" wide white stripes at borders with 12" wide white lines perpendicular to boards and set 3ft. on center.

3. Stop lines shall be 2ft. wide white stripe.
 4. Barrier lines shall be 4" wide yellow.
 5. Edge of lane lines shall be 4" wide white stripes.
 6. Directional arrows, letters, etc. shall be color and size as depicted on plans.
 7. GC shall contact the local Fire Marshall and provide fire zone markings as required.
- B. Certain products may require thermoplastic markings for certain specific components. If required, this will be indicated on the drawings.
- C. When pavement markings are applied under traffic, the Contractor shall provide all the necessary flags, signs, cones, shadow vehicles, flashing arrow boards, etc. to maintain and protect traffic, to protect the work operation, and to protect the painted pavement markings until thoroughly dry and serviceable.
- D. The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of the normal flow of traffic shall not be allowed.
- E. The painted pavement markings shall be uniformly applied to the pavement surface at a 15 mil wet film thickness or as per manufacturer's recommendation. The applied pavement markings shall have clean-cut edges and true and smooth alignment.
- F. The Contractor shall repair and or replace any markings damaged during the performance of the work.

END OF SECTION



DIVISION 2 - SITE WORK

SECTION 02600 - HOT MIX ASPHALT (HMA) PAVEMENT SYSTEM

PART 1 - GENERAL

1.01 GENERAL

- A. These specifications are intended to meet the 2008 N.Y.S.D.O.T. standard specifications U.S. Edition Section 403. It can be found at:
www.nysdot.gov/main/businesscenter/engineering/specificationsupdated-standard-specifications-us.
- B. GC shall be responsible for all work to be provide in conformance with sections referred to herein or within specification sections found on the N.Y.S.D.O.T. website.
- C. Drawings and General Provisions of the Contract and Supplementary conditions and Division 1 specification sections, apply to the work of this section.

1.02 SCOPE

- A. The work of this section applies to all recycled concrete aggregate (RCA) sub-base and asphalt items in the contract. The work shall consist of preparing the existing subgrade material to receive the new RCA sub-base, as well as furnishing, mixing, spreading and compacting the RCA sub-base, dense asphalt binder course and the asphalt top course to the lines, grades, and dimensions shown on the plans and as specified herein.
- B. Unless shown otherwise indicated on plans the new pavement system for roads and parking lots shall be as follows:
 - 1. Recycled concrete aggregate sub-base course shall be 6" thick (compacted) N.Y.S.D.O.T. type 1, option B, alternate A or B.
 - 2. Dense asphalt binder course shall be 3 ½ inches (compacted) thick N.Y.S.D.O.T. type 3.
 - 3. Asphalt top course shall be 1 ½ inches thick N.Y.S.D.O.T. type 6F3.
- C. Unless otherwise indicated on plans the pavement systems for tracks and tennis courts shall be as follows:
 - 1. Tracks:
 - a. Recycled concrete aggregate sub-base course shall be 6" thick (compacted) N.Y.S.D.O.T. type 1, option B, alternate A or B.
 - b. Dense asphalt binder course shall be 2 ½ inches (compacted) thick N.Y.S.D.O.T. type 3.

- c. Asphalt top course shall be 1 ½ inches thick N.Y.S.D.O.T. type 7.

2. Tennis Courts:

- a. Recycled concrete aggregate sub-base course shall be 6" thick (compacted) N.Y.S.D.O.T. type 1, option B, alternate A or B.
- b. Dense asphalt binder course shall be 2 ½ inches (compacted) thick N.Y.S.D.O.T. type 3.
- c. Asphalt top course shall be 1 ½ inches thick N.Y.S.D.O.T. type 7.

- D. Unless otherwise indicated on plans, asphalt play surfaces and walks shall be 2" Type 7 asphalt over 6" RCA as described in B above.

1.03 RELATED SECTIONS

- A. 01451 - Tests, Inspections and Special Provisions.
- B. 02000 - Site Work - General Provisions
- C. 02105 - Stakeout
- D. 02200 - Earthwork
- E. 02270 - Sediment and Erosion Control Procedures & Requirements
- F. 02400 - Site Drainage
- G. 02577 - Pavement Markings
- H. 03300 - Cast-in-Place Concrete

1.04 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 01300 - Submissions.
- B. For the recycled concrete aggregate (RCA) the Contractor shall submit a sieve gradation for approval by the architect. Along with sieve, the Contractor shall submit documentation that the material to be provided will be obtained from a N.Y.S.D.E.C. registered or permitted construction and demolition (C & D) debris processing facility as specified in Section 360-16.1 of 6NYCRR Park 360 "Solid Waste Management Facilities." If blast furnace slag is to be used, provide beneficial use determination (BUD) prior to its use as specified in the 6NYCRR par 360-1.15, "Solid Waste Management Facilities."
- C. For the asphalt binder and top course, the Contractor shall submit to the Architect for approval, the job mix formula with current date, job location, asphalt plant, and contractor name. The type of asphalt and course shall also be stated. The job mix formula sheet shall indicate the gradations of the aggregates to be used in the mix along with the PGB content.
- D. It shall be the Contractors responsibility upon the initial delivery of the materials and during subsequent deliveries, to

take samples for testing as described In Section 1.06 Quality Assurance. If for any reason the Owner or Architect shall request the material be tested, the Contractor shall provide the samples free of charge. If requested the Contractor shall also perform, free of charge, core samples of the constructed work for testing. All test results will be copied to the Contractor for their record.

- E. Contractor shall provide written certification on their company letterhead that all installed asphalt was produced and installed in accordance with N.Y.S.D.O.T. specifications and guarantee work against structural and material defects for a period of one year from completion date.
- F. Interim and final as-built surveys; reference Quality Assurance section below and Specification Section 01720.

1.05 QUALITY ASSURANCE (RCA SUB-BASE)

- A. The Contractor is responsible to establish and maintain required design, grades, lines and elevations including crown and cross-slope of sub base course.
- B. An independent testing laboratory, selected and paid for by the Owner shall be retained to perform construction testing of the in place sub-base course, for compliance with the Contract Documents. The Contractor shall arrange for and schedule the testing. The sub-base course shall be checked for thickness and tolerance by rod and level readings on a 50 ft. grid or as directed by the Architect. Readings shall be to +0.05' of design elevation that allow for asphalt thickness as shown on the Contract Documents. The Contractor shall at no cost to the Owner provide instruments personal and a suitable benchmark. Any deficiencies shall be corrected prior to proceeding with paving operations.
 - 1. Prior to paving parking lots or plaza areas greater than 10,000 sf, the contractor shall provide an interim topographical survey of the RCA Sub-base in the datum of the Construction Documents for review for conformance by the Architect. Said survey is required to be performed a licensed land surveyor. Spot elevations on said survey shall be in complimentary locations to the Construction Drawings.
- C. The following tests shall be performed on the sub-base material ASTM 1557 or ASTM D698 compaction test to determine % of compaction and molding water content needed to achieve the required engineering properties of the sub-base.
- D. The following test shall be performed on the sub-base material ASTM D4318 determination of the liquid limit, plastic limit, and the plasticity index of soils.

- E. In place sub-base material shall be tested in accordance with ASTM D1556 to determine the in place density and unit weight of soils using a sand cone apparatus, or ASTM D2167 to determine the in place density and unit weight of the compacted sub-base.
- F. The sub-base material shall be compacted to not less than 98% of optimum density as determined by ASTM D698 or 95% as determined by ASTM D1557, unless otherwise indicated on the drawings.
- G. The in place sub-base material shall be tested for thickness and compaction for each 5,000 square feet for jobs up to 20,000 s.f. and for each 10,000 s.f. for jobs larger than 20,000 s.f.
- H. The independent testing laboratory shall prepare test reports that indicate test location, elevation data from a construction site benchmark, and test results. The Owner, Architect and Contractor shall all be provided with copies of reports within 96 hours of the time the test was performed. In the event that any test performed fails to meet these specifications, the Owner and the Contractor shall be notified immediately by the testing laboratory. It shall be the Contractor's responsibility to correct any non-conforming work at no additional cost to the Owner and pay for all additional testing by the independent testing laboratory to prove corrective work is in conformance with these specifications.

1.06 QUALITY ASSURANCE FOR HOT MIX ASPHALT (HMA)

- A. All materials for hot mix asphalt (HMA) production, such as, aggregates, PG binder, reclaimed asphalt pavement (RAP), mineral filler, or any other materials shall meet N.Y.S.D.O.T. requirements.
- B. The Contractor shall be responsible for quality control (QC). QC is defined as all activities required to produce HMA that meets all specification requirements. The Contractor shall provide HMA and assume all responsibilities for all QC activities at the production facilities.
- C. Methods of Sampling and Testing
 - 1. All HMA material shall be sampled and the properties enumerated in these specifications shall be determined in accordance with the following methods, as currently revised.
 - a. Sampling mineral aggregates ASTM: D-75
 - b. Sampling bituminous mixtures ASTM: D-979
 - c. Sieve analysis of aggregates ASTM: C-136
 - d. Determination of bitumen content ASTM: D-1097
 - e. Specific gravity of coarse aggregate ASTM: C-127
 - f. Specific gravity of fine aggregate ASTM: C-128
 - g. Sieve analysis of mineral filler ASTM: D-546
 - h. Sampling bituminous materials ASTM: D-140
 - i. Liquid limit, plastic limit & plasticity index ASTM: D-4318

Or current applicable methods recommended by the American Association of State Highway Officials, and/or The Asphalt Institute.

- D. The PG binder will be accepted on the basis of PG binder suppliers certification. The Contractor shall provide a copy to the Owner.

PART 2 - MATERIALS

2.01 COMPOSITION OF MIXTURES (RCA)

- A. Recycled concrete aggregate sub-base shall conform to N.Y.S.D.O.T. specification section 304, U.S. latest edition.
1. Contractor shall provide suitable material conforming to the requirements of N.Y.S.D.O.T. Section 203 and to the requirements contained herein.
 2. Provide RCA which meets the specification material requirements and is within the Contractors capabilities to place and fine grade to the required tolerances.
 3. If Alternate A is used, furnish materials of at least 95%, by weight, of recycled portland cement concrete aggregate (RCA), and free from organic and other deleterious material. This material may contain up to 5% by weight asphalt and/or brick.
 4. If Alternate B is used, furnish a mixture of recycled portland cement concrete aggregate (RCA) conforming to Alternate A above mixed with stone, sand, gravel or blast furnace slag. This material may contain up to 5% by weight asphalt and/or brick.
 5. Gradation for RCA shall conform to the following:

Sieve Size Designation	Percent Passing by Weight
4 inch	-
3 inch	100
2 inch	90 - 100
¾ inch	30 - 65
No. 40	5 - 40
No. 200	0 -10

7. Material will be accepted on the basis of magnesium sulfate soundness loss after four cycles of 20% or less. The required plasticity index of the material passing the No. 40 sieve is 5.0 or less.
8. A flat or elongated particle is defined herein as one which has its greatest dimension more than three times its least dimension. Provide material consisting of particles where not more than 30% by weight, of the particles retained on a

½ inch sieve are flat or elongated. Material with a percentage greater than 30 will be rejected.

2.02 COMPOSITION OF MIXTURES (HMA)

- A. The HMA plant mix will generally be composed of a mixture of aggregate reclaimed asphalt pavement (RAP), filler if required, and PG binder. For any HMA required by the plans, formulate a job mix formula that satisfies the general limits imposed by N.Y.S.D.O.T. Table 403-1 Composition of Hot Mix Asphalt Mixtures latest version). A copy of this table can be found at the end of this section. See section 1.02B for system components. For type 6F3 mixture, determine the optimum asphalt content for the proposed gradation using the Marshall mix design method (50 blows). The resultant mixture shall meet the following Marshall properties.

Mix Property	Type 6F3
Air Voids %	3.0 - 5.0
Voids in Mineral Aggregate	14
Voids filled with Binder VFB, %	65 - 78

Contractor shall produce, deliver to the work site, and incorporate the mixture into the work within the mixing and placing temperature range imposed by Table 403-1 Composition of Marshall designed plant mixtures. The plant mixed material will be accepted after blending and mixing at the plant. The pavement courses will be accepted after all paving operations are completed and certified by the Contractor.

- B. Fine aggregate will consist of materials conforming to the requirements of Section 703-01 - Fine Aggregate of the N.Y.S.D.O.T. specifications. In addition, fine aggregate may consist of screenings, free from deleterious materials and manufactured from sources of stone, gravel, or slag meeting the requirements of N.Y.S.D.O.T. specification section 703-02, Coarse Aggregate.
- C. Coarse aggregate will consist of crushed stone, crushed gravel or crushed slag conforming to the N.Y.S.D.O.T. requirements of section 703-02, Except for Gradation.
- D. When aggregates from approved natural fine sand sources are combined with coarse aggregates in the mixture, aggregate particles will meet additional requirements as follows:
1. Particles in the No. 1A and No. 1 primary sizes will meet the quality requirements of N.Y.S.D.O.T. specification section 703-02 and will have a minimum of 85% by weight, of the particles with at least two fractured faces.

2. Particles in the No. 2, No. 3 and No. 3A primary sizes will meet the quality requirements of N.Y.S.D.O.T. section 703-02 and will have a minimum of 75%, by weight, of the particles with at least one fractured face.
- E. Coarse aggregate type 6F3 conditions:
1. Limestone or a blend of limestone and dolomite having an acid-insoluble residue content of not less than 20%
 2. Dolomite
 3. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
 4. Gravel, or a natural or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore trailings, slag or other similar materials meeting the following requirements:
 - a. (Type 6F3 Mixes) non-carbonate plus 1/8 inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes of materials of different specific gravities). Additionally, a minimum of 20% plus ¼ inch particles must be non-carbonate.
 - b. When coarse aggregate for these mixes are from more than one source or of more than one type of material, proportion and blend them to provide a uniform mixture.
- F. Mineral filler if required in the mix to meet gradation requirements, shall conform to the requirements of the N.Y.S.D.O.T. specification section 703-08, Mineral Filler.
- G. Performance graded binder (PG Binder) shall meet the requirements of the N.Y.S.D.O.T. specification section 401- 2.04, Performance Graded Binder. Unless the type of PG Binder is specified in the Contract Documents, use PG 64-22, or a PG Binder specified in Table 6-4, Performance Graded Binder section of Chapter 6 of the Comprehensive Pavement Design Manual.
- H. Reclaimed asphalt pavement (RAP) shall meet the requirements as written in the materials method (MM) 5.16 superpave hot mix asphalt mixture design and mixture verification procedures.

TABLE 403-1 COMPOSITION OF HOT MIX ASPHALT MIXTURES
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Mixture	Base				Binder		Shim		Top ^{3, 4}			
Require- ments ¹	Type 1		Type 2		Type 3		Type 5		Type 6, 6F2, 6F3		Type 7, 7F2, 7F3	
Screen Sizes	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %	General limits % Passing	Job Mix Tol. %
2 in	100	—	100	—	—	—	—	—	—	—	—	—
1 ½ in	90–100	—	75–100	±7	100	—	—	—	—	—	—	—
1 in	78–95	±5	55–80	±8	95–100	—	—	—	100	—	—	—
½ in	57–84	±6	23–42	±7	70–90	±6	—	—	95–100	—	100	—
¼ in	40–72	±7	5–20	±6	48–74	±7	100	—	65–85	±7	90–100	—
1/8 in	26–57	±7	2–15	±4	32–62	±7	80–100	±6	36–65	±7	45–70	±6
No. 20	12–36	±7	—	—	15–39	±7	32–72	±7	15–39	±7	15–40	±7
No. 40	8–25	±7	—	—	8–27	±7	18–52	±7	8–27	±7	8–27	±7
No. 80	4–16	±4	—	—	4–16	±4	7–26	±4	4–16	±4	4–16	±4
No. 200	2–8	±2	—	—	2–8	±2	2–12	±2	2–6	±2	2–6	±2
PGB Content % ²	4.0–6.0	0.4	2.5–4.5	0.4	4.5–6.5	0.4	7.0–9.5	0.4	5.4–7.0	NA	5.7–8.0	NA
Mixing & Placing Temp. Range, °F	250–325		225–300		250–325		250–325		250–325		250–325	
Description and Typical Uses	Dense Base: For general use		Open Base: For permeable base layer		Dense Binder: Intermediate layer for general use		Shim: Fine HMA mixture for shimming ruts and leveling		Top Course: Dense course for single course resurfacing of rural, suburban, and urban roadways			

1. All aggregate percentages are based on the total weight of the aggregate.
2. The asphalt content is based on the total weight of the mix. When using slag aggregates in the mix, increase the PGB content accordingly, a minimum of 25% for an all slag mix.
3. 6F2, 6F3, 7F2, 7F3 mix types require friction coarse aggregates, and are required for mainline driving surface courses.
4. For Type 6 and Type 7 (F9) aggregate requirements, Marshall design will not be required. These mix types are suitable where the State's requirements for f9 aggregate apply.
5. Introduce the PG Binder into the pug mill between 225°F and 350°F, or as recommended by the PG Binder supplier.

2.03 TACK COAT

- A. Tack coat shall meet the requirements of the N.Y.S.D.O.T. specification section 407-2, Materials. The tack coat shall meet the requirements of Table 702-10, Tack Coat. Tack coat shall be on the N.Y.S.D.O.T. approved materials list.

TABLE 702-10 - TACK COAT		
Test Requirements	Min	Max
Sieve Test, %	—	0.10
Residue by Distillation %	38	45
Oil Distillate, volume of total emulsion %	—	2
Test on Residue Distillation: penetration, 77°F (25°C), 100g, 5 second	40	90
Suggested spraying temp, °F	75	150

- B. Application of Emulsion Material

1. The asphalt emulsion contained in the distributor tank shall be homogenous. Emulsified asphalts held in storage tanks, drums, or distributors for long periods are subject to settlement. The asphalt emulsion shall be sufficiently agitated or circulated to ensure a homogenous emulsion prior to sampling or application.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE

- A. The subgrade surface is the surface of the road section upon which the select materials and/or sub-base are placed. The Contractor shall be responsible to cut and fill subgrade as required to achieve design grades. The subgrade area shall be prepared in conformance with N.Y.S.D.O.T. section 203, Excavation and Embankment. It shall be the Contractor's responsibility to properly place and compact all materials in the road section and to correct any deficiencies resulting from insufficient or improper compaction of such materials throughout the Contract period. The Contractor shall determine the type, size and weight of the compactor best suited to the work at hand, select and control the lift (layer) thickness, exert control over the moisture content of the material, and other details necessary to obtain satisfactory results. The subgrade shall be compacted to density in accordance with section 02200 - Earth Work, but not less than 95% of modified proctor maximum dry density.

3.02 RCA SUBBASE

- A. RCA subbase course shall be placed in conformance with section 304 of the N.Y.S.D.O.T. standard specifications US latest edition.
- B. Contractor shall place RCA in a single layer with a minimum compacted layer thickness of 6 inches.
- C. When the moisture content is within the limits for proper compaction, compact the material in accordance with the requirements of section 203-3.12 N.Y.S.D.O.T. specifications.
- D. If the subbase course is disturbed by frost action prior to paving, re-compact the subbase.
- E. If, in the opinion of the Architect, the subbase is damaged or mixed with the subgrade or any other material due to the Contractor's operation the Contractor shall remove such material and replace it with the appropriate subbase at no additional cost to the Owner.
- F. Place subbase so that after compaction the top surface of the course does not extend more than ¼" above nor more than ¼" below true grade for the course at any location.

3.03 CONDITIONS FOR PLACEMENT OF ASPHALTIC MATERIALS

A. Weather - Seasonal Limitations

1. The mixing and place of hot-mix asphalt shall be performed only when weather conditions are suitable. When pools of water are observed on the base, mixing and placing of hot-mix asphalt shall not be permitted. The temperature of the surface on which hot-mix asphalt is placed shall be as per Table 402-2.
2. Bituminous concrete pavement placed between November 30th and April 1st shall be subject to the following conditions and regulations:
 - a. Approval of the Engineer.
 - b. Compliance with Table 402-2 below.
 - c. Acceptance of full responsibility by the Contractor for all work so placed.
 - d. Providing for such guarantees and deposits as are required by Town regulations.
 - e. Guarantee of all work so placed for a period extending up to one year. A notification from the Engineer before the end of the last month of the calendar year following shall be deemed to be within the period of guarantee.

TABLE 402-2 TEMPERATURE AND SEASONAL REQUIREMENTS		
Nominal Compacted Lift Thickness	Surface Temperature (Minimum (Note 1))	Seasonal Limits
≤ 1 in.	50°F	(Notes 2 & 3)
1 in. < Thickness ≤ 3 in.	45°F	(Notes 2 & 3)
>3 in.	40°F	None

NOTES:

1. Measure all temperatures on the surface where the mixture is to be placed and the controlling temperature will be the average of three temperature readings taken at locations a minimum of 25 ft apart.
2. Unless otherwise authorized place Top Course only during the period of April 1st up to and including November 30th in the counties of Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, and the City of New York.
3. Unless otherwise authorized place Top Course only during the period of April 15th up to and including October 31st in all counties except as required in Note 2.

3.04 TACK COAT

- #### A.
- Apply a thin, uniform tack coat under the provisions of N.Y.S.D.O.T. section 407, Tack Coat to surfaces of existing asphalt, Portland cement concrete layers including such areas as adjacent pavement edges, curbing, gutters, manholes, and other structures, immediately prior to place the HMA mixture against them.

- B. Apply tack coat on the contact surfaces between all HMA pavement lifts in accordance with N.Y.S. D.O.T. Section 407, Tack Coat, prior to placing HMA mixture regardless of time period between lifts. The only exception to this is the surface of permeable base courses. Paving over a tack coat should not commence until the emulsion has broken (goes from brown to black) or is tacky when touched.
- C. The tack coat shall be applied to a prepared clean pavement and in a manner to offer the least inconvenience to traffic and to reduce pickup or tracking of the bituminous material. Upon application the material shall be as uniformly spread across the width of the designated area.
- D. The tack coat shall not be applied on a wet pavement surface or when the pavement surface temperature is below the temperature requirements outlined in Table 402-2 *Temperature and Seasonal Requirements*. To avoid "boil-off" of the water, the asphalt emulsion shall not be heated above 195°F. The application rate shall be as determined in Table 407-1.

TABLE 407-1 TACK COAT APPLICATION RATES	
Surface Type	Application Rate (gallons per square yard)
New Hot Mix Asphalt	0.03 - 0.04
Milled Surfaces	0.05 - 0.06
Portland Cement Concrete	0.05 - 0.06
Vertical Surfaces (curbs, drainage structures, and appurtenances)	0.06-0.07

3.05 SPREADING AND FINISHING OF HMA

- A. Lay the mixture upon an approved clean, tack coated surface. The only exception to this is the surface of permeable base courses. Spread and strike off to the established grade and elevation. Use HMA paver(s) to distribute the mixture either over the entire width or over such partial width as may be practicable. Upon arrival at the site, the trucks will dump the mixture into the paver. Immediately spread and strike off to the required width and appropriate loose depth to obtain the required compacted thickness at completion of the work.
- B. When the initial pavement course is laid with automatic HMA pavers, guide the paver by a taut reference line positioned at or near the pavement centerline or edge. Erect and maintain the reference line. Support the reference line at approximately 25 foot intervals on tangent sections and at closer intervals on curves. Tension the line sufficiently to remove any sags. A moving reference of at least 30 ft. in length in lieu of a reference line may be used. The moving reference may be a floating beam, ski, or other suitable type such that the resulting pavement layer surface is sufficiently even. A short ski or shoe may also be used for the initial course if a satisfactory fixed reference such as a curb, gutter, or other fixed reference is adjacent to the pavement. When the proposed

floating beam or the short ski does not produce the results similar to those obtained using a taut reference line, do not use these devices.

- C. Place subsequent pavement courses over the initial course using one of the above methods. In addition, any course in an adjacent lane may be used as the reference for the use of a short ski.
- D. The automatic screed controls will not be required where existing grades at roadway intersection or drainage structure must be met, for shoulders, temporary detours, behind curbs, or in other areas where its use is impractical.
- E. If there are less than 1500 square yards in the Contract, or the areas to be paved are small and scattered, the HMA mixture may be spread by hand methods. For these areas, dump and spread the mixture such that the compacted thickness meets the specified thickness in the plans.
- F. Prior to the beginning of rolling, check the loose mat, adjust any irregularities, and remove and replace all unsatisfactory material.

3.06 COMPACTION OF HMA

- A. Immediately after the HMA mixture has been spread, struck off and surface irregularities adjusted, thoroughly and uniformly compact it by rolling. Roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving. Initially roll all courses with the roller traveling parallel to the centerline of the pavement beginning at each edge and working toward the center. Roll banked curves starting at the low side edge and working toward the super-elevated edge.
- B. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from other causes, by the use of rakes and addition of fresh mixture as required. Exercise care in rolling so as not to displace the line and grade of the edges of the HMA mixture. To prevent adhesion of the mixture to the drum(s) and pneumatic tires, keep the drum(s) and the pneumatic tires properly moistened with water or water mixed with small quantities of detergent or other approved material. Any petroleum products or solvents having an adverse effect upon the HMA pavement will not be permitted for use.
- C. There shall be no visible defects, such as shallow ruts, ridges, roller marks, cracking, tearing, segregation, or any other irregularities as determined by the Architect, in the pavement when the rolling operation is complete. If these defects are present, correct these defects to the satisfaction of the Architect or remove & replace the pavement at no additional cost.
- D. Along forms, curbs, headers, walls and other areas not accessible to the rollers, thoroughly compact the mixture with mechanical tampers. On depressed areas, use a trench roller or a small

vibratory roller. Cleated compression strips may also be used under the roller to transmit compression to the depressed area.

- E. Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is in any way defective with fresh HMA mixture which shall be compacted to conform with the surrounding area. Correct any area showing an excess or deficiency of HMA material to the satisfaction of the Architect.
- F. Compaction shall be per Three Roller Compaction Train
1. Initially roll all HMA mixtures with an approved steel-wheel roller operating in a static mode. Overlap the previous roller passes by one-half the width of the roller.
 2. Immediately following the initial rolling, roll the mat with an approved pneumatic rubber-tired roller. A minimum of 3 passes of the rubber-tired roller will be required. One pass is defined as one movement of the roller over any point of the pavement in either direction.
 3. Immediately following the intermediate rolling, finish roll the mat with a steel-wheel roller to remove all shallow ruts, ridges, roller marks and other irregularities from the surface.
 4. Use this compaction method only when the compacted thickness of the finished mat is 4 inches or less. Unless approved by the Architect, the roller speeds shall not exceed 3 mph. when paving multiple lanes simultaneously; increase the required number of rollers proportionately for each additional full lane width unless otherwise permitted by the Architect.
- G. The required number of passes listed in Table 403-2, Number of Passes, is recommended and may be increased as necessary to achieve adequate density.

TABLE 403-2 NUMBER OF PASSES		
Pavement Courses	Three Roller Train (Static)	
	Steel Wheel Roller	Pneumatic Roller
Base (Open Graded Each Lift)	4	3
Base (Dense-Graded)	4	3
Binder (Dense-Graded)	2	3
Top (Dense-Graded All Types)	2	3

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02801 - TOPSOIL, LAWNS AND GRASSES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work of this section is subject to all applicable provisions of the "General Conditions" and "Supplementary General Conditions", which form a part hereof whether attached hereto or not.
- B. Under this item, the Contractor shall furnish and install topsoil, lawns and grasses in accordance with the plans, specifications, and as ordered by the Architect. This Contract includes all work of this Trade for a complete coordinated job, in order to provide an acceptable stand of turf by creating a rootzone mixture with seed or sod, including **decompaction of existing 12" of existing play field surfaces**, grading, topdressing, placing topsoil, soil amendments and sod, in accordance with the drawings as specified. The Contractor recognizes that the Plans and Specifications which form a part of this Contract reflect the overall intention and functional purpose, but that in all aspects the detailed Plans and Specifications might not be complete, but the Contractor does include as part of this work any and all provisions whether or not shown, to make his work under this Contract complete in every respect and to make any and all systems that he is responsible for complete system and to be in accordance with all authorities having jurisdiction.
- C. Furnish all labor, material and appurtenance required for the installation of Topsoil and Seed as shown on the drawings and/or as herein specified. In general the work shall include but not necessarily be limited to the following:
- (1) Decompaction of existing 12" of existing play field surfaces, and placing (fine-grading) of topsoil as required for seeding.
 - (2) Seeding, sodding and establishing permanent grass lawns or swale areas.
 - (3) All other work required to complete the work of seeding, sodding and related items as shown on the drawings and as herein specified.
 - (4) Establishment, protection, maintenance, clean-up and replacement of lawns as required under the specified guarantee.
- D. The work must comply with the requirements of the following related specifications sections:
1. **Division 1 Section "LEED Requirements" for additional LEED requirements (For LEED Certified Projects).**
 2. **Division 1 Section "Construction Waste Management" for recycling construction waste (For LEED Certified Projects).**
 3. **Division 2 Section 02200 "Earthwork".**

4. Division 2 Section 02270 "Sediment and Erosion Control".

1.02 SHOP DRAWINGS, SUBMISSIONS AND APPROVALS

- A. All submissions shall be in accordance with Section 01300 submission requirements.
- B. Submit manufacturer's product data for each material or accessory to be utilized in association with the work of this section. Include MSDS sheets for all fertilizers and limestone.
- C. Submit topsoil certifications and test reports.
- D. Within seven (7) calendar days after awarding of the Contract, submit the following:
 - (1) List of all materials, equipment, and manufacturers proposed to be furnished. Shop drawings will not be reviewed prior to approval of the list of manufacturers.
 - (2) List of name of any subcontractors to be used for approval.
- E. Interim and final as-built surveys; reference Quality Assurance section below and Specification Section 01720.
- F. **LEED Submittals: For LEED Certified Projects: Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements".**

1.03 REQUIREMENTS / QUALITY ASSURANCE

- A. The Contractor shall provide his own Engineer and/or Licensed Surveyor for establishing all topsoil and seed limits in the field and grades as required to meet the requirements of the Contract Documents.
 - 1. For athletic fields: Upon completion of subgrade, prior to laying topsoil, the contractor shall provide an interim topographical survey in the datum of the Construction Documents for review for conformance by the Architect. Spot elevations on said survey shall be in complimentary locations to the Construction Drawings.
- B. Notice of Sources: Within 10 days following award of Contract, the Contractor shall notify the Architect of the sources of the materials required; they may be inspected and tested if desired by the Architect.
- C. Topsoil Testing: The Contractor shall take samples of the topsoil and have tests made to determine the appropriate proportions of supplements necessary for properly conditioned material (such as

"Quick Test" to determine if lime should be used). Methods used shall be as approved by the Association of Agricultural Chemists or the State Agricultural Experiment Station. Preparation work necessary to bring the topsoil into proper condition to receive seeding shall be made in accordance with said tests at no additional cost to the Owner. Copies of said tests and recommendations are to be submitted to the Architect for approval prior to starting the Work of this Section.

- D. Seeds: Packages of seed shall bear official State or Federal stamps and certificates indicating the type, quality, and content of the seed packages. Deliver packages unopened.

1.04 VERIFYING CONDITIONS

- A. The Contractor shall examine all drawings which may affect the work of this section or require coordination by same.
- B. Before starting any work, examine existing conditions and thoroughly check all drawings, specifications, adjoining or underlying conditions in which the work of this section is to be performed, and all dimensions.
- C. Report in writing to the Architect any and all conditions which may interfere with or otherwise affect work of this section.
- D. Seeding operations shall be conducted under favorable conditions during the next season or seasons which are normal for such work as determined by accepted practice in the locality of the Project.

1.05 PROTECTION OF WORK

- A. Landscaped areas shall be protected by the Contractor against traffic damage, erosion, or other use by erecting barricades or temporary fencing immediately after seeding is completed and by placing warning signs of a type approved by the Architect on various areas. These barricades, or temporary fencing, and signs shall be maintained until the lawns are well established.
- B. The Contractor shall maintain all seeded areas without additional payment until the expiration of the maintenance period. Any areas that fail to show a uniform stand of grass will be reseeded and re-fertilized at the Contractor's expense, until an acceptable stand of grass is established.
- C. Upon final acceptance of the work specified herein, the Contractor shall remove all barricades or temporary fences.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil: Stockpiled topsoil may be used, provided it meets the requirements of these specifications. Additional topsoil from certified off-site sources shall be used, provided it meets the requirements of these specifications. Topsoil for lawn and planting operations shall be fertile, friable, natural loam containing a liberal amount of humus. It shall be free of admixtures and subsoil and shall be reasonably free of noxious weed, seed, lumps, plants, or their roots, and completely free of stones, sticks, and other extraneous matter, and shall not be used for planting operations while in a frozen or muddy condition. After spreading to a uniform depth of 6" minimum, all topsoil shall be raked to remove all extraneous matter. Raked topsoil shall conform to the mechanical analysis specified below and shall be free of stones, lumps, plants or their roots, sticks and similar debris, or any other undesirable material. Topsoil shall not be used in a muddy or frozen condition.

1. All topsoil to be furnished shall be subject to the approval of the Architect. Furnish a certified analysis, made by a recognized authority, of any topsoil that may have to be furnished to complete the work of this section. Test reports shall match the format listed below.
2. Topsoil shall have an acidity range of pH 5.0 to 7.0 and shall contain not less than 6 percent organic matter as determined by loss on ignition of moisture-free samples dried at 100 degrees centigrade. The mechanical analysis of the soil shall be as follows:

<u>Passing</u>	<u>Retained On</u>	<u>Percentage</u>
1" screen		100%
1" screen	¼" screen (gravel)	Not more than 3%
¾" screen	No. 100 USS mesh sieve (sand)	40%-60%
#100 USS	(Very fine sand, silt & clay)	40%-60%

3. Topsoil in which more than 60 percent of the material passing the USS No. 100 mesh sieve consists of clay as determined by the Pouyoucous hydrometer or by the decantation method, shall not be used. All percentages are to be based on dry weight samples. The chemical and mechanical analysis shall state the above items in correct quantities.
4. The Architect reserves the right to take samples of the topsoil from time to time, whether delivered to or stored at the site. These samples will be analyzed for comparison with the Specifications. Should tests show that topsoil does not comply with the Specifications, the material may be rejected or such other remedy made as approved by the Architect in the form of the addition of humus or other supplemental materials.
5. The topsoil mixture materials shall be thoroughly mixed by

hand or by rotary mixer to the satisfaction of the Architect.

- B. Sand: Sand shall be ASTM C-33 concrete sand. The sand shall have a fineness modulus of 2.5-3.2 and a coefficient of uniformity of less than 4.
- C. Ground Limestone: Ground Limestone (calcium carbonate) shall have the following analysis: at least fifty (50) percent shall pass a 200 mesh sieve; at least ninety (90) percent shall pass a 100 mesh sieve; and one hundred (100) percent shall pass a 10 mesh sieve. Total carbonate shall not be less than eighty-five (85) percent for purposes of calculation, total carbonate shall be considered as calcium carbonate.
- D. Organic Fertilizer: Organic fertilizer shall be used for surface application after grass has germinated. Organic activated fertilizer shall contain the following percentage by weight: 5% minimum of nitrogen, 45% phosphoric acid, and other nutritious basic elements.
- E. Chemical Fertilizer: Commercial fertilizer shall be used for initial preparation and shall conform to the applicable state fertilizer laws. Commercial fertilizer shall be a complete fertilizer and shall be an organic based product suitable for the establishment of the turf and grass species described herein and/or as noted on the Contract Plans. Examples of acceptable products and Suppliers/Manufacturers are: *PRO-GRO* by *North Country Organics* of Bradford VT., Ph. (802) 222-9661; *LAWN BOOSTER* by *Organica Inc.* of Norristown PA., Ph. 1-888-24GREEN, or locally at (631) 544-0348.
 - 1. Application rate, sequence, and methods shall be as recommended by the manufacturer based on soil conditions of the areas of installation as tested by the Contractor, and on the intended grass stand character (i.e. turf area). The Contractor shall coordinate the review of the recommendations between the Architect, the Manufacturer, and the Contractor's Installer. Commercial fertilizer application shall be properly coordinated with the application of any other soil amendments that may be necessary.
- F. Humus / Compost: Humus shall be of native type and consist of reed peat or sedge peat, but not peat moss, and of such physical condition that it can be readily incorporated with topsoil. It shall be free from sticks, stones, weedy roots, glass or toxic substances or other foreign matter. When delivered from stock piles, humus shall contain between 35 percent and 50 percent moisture. Use only natural domestic humus suitable for soil mulch and of such composition as to furnish ample water holding capacity and retention of plant food. Humus shall be dark brown to black in color, granulated, free of weed seed and lumps and show analysis as follows:
 - (1) 25 percent - 45 percent moisture by weight as delivered from stockpile.
 - (2) 5.0 - 7.5 pH (acidity).
 - (3) Minimum 300 percent water absorbing ability (oven dried at 100 C.).
 - (4) 85 percent minimum organic matter on dry basis (samples dried at 65 C.).

- (5) Low in content of wood material, sulphur, iron, or other heavy metals.
- (6) Ash, on dry basis: not more than 10 percent.
- (7) Soluble salts less than 4.0.
- (8) Solvita Maturity number between 6 and 8.
- (9) Carbon / Nitrogen ratio - greater than 30:1.
- (10) Particle size shall pass a $\frac{1}{4}$ " screen.
- (11) Low phosphorous and nitrogen content.

Humus shall be obtained from fresh water site, conditioned in storage piles after excavation for at least 6 months, including one freezing, thawing period.

Certification and Testing: The Contractor shall submit a certificate of materials regarding the composition of the compost from a certified Seal of Testing Assurance Program, Compost Testing Program Laboratory. The test shall be for the actual material to be used on the project, from the stock piles. Stock piles of this material shall be visited by the Landscape Architect, with all expenses paid for by the Contractor.

One such laboratory is located on Long Island:

SOIL FOODWEB NEW YORK, INC.
 555-7 Hallock Avenue
 Port Jefferson Station, NY 11776
 Phone: (631) 474-8848
 Fax: (631) 474-8847
 info@soilfoodwebnewyork.com

- G. Mulch: Weyerhaeuser "Silva-Fiber", or equal, available from American Excelsior Corporation, Chicago, Illinois.
- H. Erosion Control Blanket: Use "Ero-Mat, standard", as manufactured by Verdyol and distributed by Erosion Control Systems, Inc., Tuscaloosa, Alabama; (1-800-942-1986). Install with 11 gauge or heavier steel wire staples with 6 inch long legs and a 1 inch crown. Note: "Ero-Mat, High Velocity" for use on slopes greater than 3:1 and 60 ft. long; or in areas where a high velocity of water is expected - duration is 4-1/2 to 5 feet/second range (in swales).
- I. Water for Turf Establishment: Water suitable for turf establishment will be available on-site to the Contractor as coordinated with the Owner. The Contractor shall provide all devices required for the distribution of water (provided by Owner) until turf is fully established. If an irrigation system has been installed or is already in place, this shall serve for distribution. The proper amount and frequency of watering will be the responsibility of the Contractor. In general terms, during dry weather, grassed areas shall be watered daily with sprinklers until grass is firmly rooted.
- J. Grass Seed: The Contractor shall furnish and place all materials required for seeding in all topsoiled areas. The seed used shall be fresh, re-cleaned seed of the latest crop, mixed in the following proportions by weight, and meeting the following standards of pure live seed content. The tolerance for PLS (purity x germination)

shall be those called official and tabulated on page 5, US Department of Agriculture Bulletin No. 480.

Grass seed mixes shall be as noted below. Submit mix percentages for approval. Percent pure live seed (PLS) shall be 95% minimum. Maximum percent weed seed shall be .50%. Germination shall be 85% or better.

All seed shall be delivered in the original packages, unopened, which shall include a guaranteed analysis by the vendor. The seeds shall be pre-mixed prior to delivery to the job site, or as otherwise directed by the Architect. The grass seed shall be of the latest crop, mixed in the following proportions by weight:

70% - Tall Fescue
20% - Turf-type Ryegrass
10% - Kentucky Bluegrass

All seed shall exhibit minimum 98% Purity and minimum germination of 90%.

Unless specifically indicated otherwise above, the following varieties of turfgrasses shall include:

Tall Fescue: *Rebel, Falcon, Mustang, Jaguar, Hounddog.*
Turf-type Ryegrass: *Manhattan II, Prelude, Palmer, Omega, Regal.*
Kentucky Bluegrass: *Eclipse, Adelphi, Glade, Sydsport, Baron.*

The rate of seeding shall be as recommended by the supplier/manufacturer for the type of seeds used in the mix and the intended purpose of the planted area. The intent of the Restored Lawn Area seeding is to provide turf lawn to blend in with the areas adjacent to the disturbed area being planted. Supplier shall coordinate the final rate with the Architect, who shall have final authority for approval. Grass seed shall be sown in the fall from August 25 to October 1, or in the spring, between March 15 and May 1. Seeding shall be done in dry or moderately dry soil, and at times when the wind velocity does not exceed 5 mph.

Sowing of Seed: Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly-fine texture. Lawn areas shall be seeded evenly with a mechanical spreader, at a rate of 10.0 pounds to 1,000 sq.ft. of area, lightly raked, rolled with a 200 pound roller and watered with a fine spray. The method of seeding may be varied at the discretion of the Contractor to establish a smooth, uniform turf composed of the grasses specified. Re-seeding shall be done in accordance with this procedure.

Grass seed shall be sown in three different passes by approved machine in such a manner that a uniform stand will result. After seeding, the surface shall be evenly raked with a fine toothed

rake and rolled with an approved roller, as directed by the Architect. Seeding by hydraulic means may be used if approval is obtained from the Architect.

K. Sod: Sod shall be provided where specified within the contract drawings and may be used as an alternative to seed to establish turf in the areas called out for seeding (at no additional cost to the Owner). The Contractor shall request the alternative if it is needed to complete the project in weather not conducive to turf establishment by seeding, or as specified on the drawings. The Architect shall approve the use of the alternative. All sod shall be grown and cut from a sand-based field. Approved sod is superior sod grown from high-quality seed of known origin. Seed is to be inspected by Certification Agency to assure satisfactory genetic identity and purity, overall high quality and free from noxious weeds at time of harvest.

1. The sod shall be of the highest quality, strongly rooted, free from noxious weeds and grubs, mowed to a height not to exceed 3" prior to lifting, cut in minimum 18" wide x 5' lengths (7-1/2 sq.ft.) to a depth of 1" minimum, or in rolls 4' wide x 50' long (200 sq.ft.) and shall be at least one year old. Measurement for thickness shall exclude top growth thatch. It shall be harvested from one field to ensure a uniform color and texture. Sod shall be machine cut. Standard sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically. Sod shall not be harvested or transplanted when moisture content may adversely affect its survival.
2. The mixture of grass seed from which the sod was grown shall consist of approximately the following mixture of permanent grasses: 70% Tall Fescue, 20% Turf-type Ryegrass, 10% Kentucky Bluegrass - or - 50% shade tolerant Kentucky Blue Grass - 20% Manhattan II Rye Grass - 30% Pennlawn Fine Fescue (blend as selected by the Architect). All sod shall be inspected prior to delivery.
3. Sod shall be harvested, delivered and transplanted within a period of 36 hours. Before cutting, sod shall be mowed uniformly at a height of 1-1/2 inches.
4. Strength of Sod Sections: Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section.
5. Moisture Content: Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
6. Thatch: Sod shall be relatively free of thatch up to 1/4 inch allowable (uncompressed).
7. Diseases, Nematodes and Insects: Sod shall be reasonably free

of diseases, nematodes and soil-borne insects.

8. Weeds: Sod shall be free of objectionable grassy and broad leaf weeds. Sod shall be considered free of such weeds if less than two (2) such plants are found per 200 s.f. of area. Sod will not be acceptable if it contains any of the following weeds: common Bermuda grass (wire-grass), quackgrass, johnsongrass, poison ivy, nutsedge, nibblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel and brome grass.
 9. Architect/Engineer may inspect the sod before it is harvested, but reserves the right to reject, on or after delivery, any sod which in his opinion does not meet with the specification requirements.
- L. Rootzone Mix Ratio: The rootzone mix shall utilize all existing topsoil stockpiled and shall incorporate an additional 3" of sand and 1" of compost at no additional cost to contract.
- M. Topdressing: The entire portion of the field not being repaired for low spot filling shall receive a full ½" of topdressing using organic matter which shall be a mature, stable compost with an organic matter content of 6-8% and be free of glass or toxic substances. This material is available from Agresource, called Agresoil Compost, and is made from bio solids, not leaf mold. Contact number: 1-800-313-3320.
- N. Overseeding: Overseeding shall be accomplished by a drill seeder in three different passes using the following seed mixture:

Percent	Turfgrass Species / Variety	Min. Purity %	Germ. %
70%	Tall Fescue	98%	90%
20%	Turftype Ryegrass	98%	90%
10%	Kentucky Bluegrass	98%	90%

Acceptable varieties of each turfgrass shall include:

Tall Fescue: *Rebel, Falcon, Mustang, Jaguar, Houndog.*

Turftype Ryegrass: *Manhattan II, Prelude, Palmer, Omega and Regal.*

Kentucky Bluegrass: *Eclipse, Adelphi, Glade, Sydsport and Baron.*

Rate of seeding shall be 10 lbs. per 1,000 sq.ft. pf pure live seed (pls.).

PART 3 - EXECUTION

3.01 STRIPPING TOPSOIL

- A. All topsoil shall be stripped as described and stockpiled for reuse. No topsoil is to be removed from the site.

3.02 GRADING AND SUBGRADE PREPARATION

- A. Perform grading operations to bring subgrade to levels required and to contour indicated on the drawings.
- B. Completed subgrade shall be approved by the Architect/Engineer before topsoil and sodding.
- C. The approved subgrade shall be scarified to a depth of 2 inches to permit mixing with rootzone material.
- D. Where work involved is not in an area designated for regarding, the existing grade shall be rototilled to a depth of 8 inches. The area shall then be leveled and stones raked out.

3.03 ROOTZONE / SEED BED PREPARATION

- A. Seasonal and Weather Limitations - All operations including seedbed preparation shall be performed only when the soil is in proper condition to permit satisfactory work. Continuation of work at other than specified times or conditions shall proceed only with consent of the Architect/Engineer.
- B. Leveling - Any undulations or irregularities in the surface resulting from tillage or any other causes shall be leveled prior to placing sod. Flooded, washed out or otherwise damaged areas shall be reconstructed and all grades reestablished in conformance with the drawings and specifications.
- C. Before any soil is placed, the subgrade shall be graded to a smooth, uniform surface, parallel to and below finished grade. The subgrade surface shall be compacted with an approved roller weighing approximately five hundred (500) pounds, then scarified to a depth of 3" for proper mix of rootzone material. Hollows, depressions and gullies shall be filled with acceptable material free from stones over two inches (2") in diameter, cinders, rubbish and other unsuitable material.
- D. **New rootzone shall be decompacted to a depth of 12"** prior to seeding or sodding utilizing a 'BLEC' Ground Breaker Machine, VertiDrain or equal; on 10" centers, using 5/8" wide slits, **12" deep** to provide compaction relief. Rototilling the fields is specifically excluded.
- E. Cleanup - Prior to placing sod, the surface shall be cleared of all trash, debris and stones larger than two inch (2") diameter, and of all roots, brush, wire, grade stakes and other objects that could be a hindrance to maintenance operations and use.
- F. Commercial Fertilizer:
 - 1. Fertilizer for Rootzone Mix: Commercial fertilizer (14-28-15) shall have the following composition by weight: Nitrogen 14%; Phosphorous 28%; Potash 14%; as manufactured by Jonathan Green "New Seeding Lawn Fertilizer".
 - 2. Fertilizer for Post Seeding/Sodding: 50% slow release commercial fertilizer (28-3-5) shall have the following composition by

weight: Nitrogen 28%; Phosphorous 3%; Potash 5%. The guaranteed analysis shall have a minimum 50% of the total nitrogen as a "slow-release" type.

- a. Contractor shall at the direction and discretion of the Architect/Engineer furnished a certified report of an approved analytical chemist, showing the analysis of representative samples of the commercial fertilizer which he proposes to use. All samples are to be taken by the Architect/Engineer, and delivered to the laboratory; the price bid shall include inspection and laboratory charges. No commercial fertilizer shall be delivered until the approval of samples by the Architect/Engineer, but such approval does not constitute final acceptance. The Architect/Engineer reserves the right to reject on or after delivery any material which does not, in his opinion, meet these specifications.
- b. Apply new seeding lawn fertilizer at the full rate recommended by the manufacturer for new lawns, using a mechanical spreader, not by hand; Fertilizer shall then be worked lightly into the top 3" of the rootzone material.
- c. Apply 50% slow-release type fertilizer as soon as sod has been installed. The first application shall be made at $\frac{1}{2}$ the manufacturer's recommended rate for new lawns. A second application shall be made at $\frac{1}{2}$ the manufacturer's rate for new lawns six (6) weeks after the first application of same.

G. Topsoil Placement and Finish Grading:

- (1) Topsoil shall be spread on the previously prepared subgrade or surface of select granular fill, scarified to permit proper bonding with the topsoil. The topsoil shall be placed on all specified areas within the Limit Lines shown on the drawings, all areas disturbed by the work of this contract, and as directed by the Architect.
 - (2) Topsoil shall be raked, properly set and compacted to establish uniform lawn/grass growth, and otherwise manipulated to form, after settlement, smooth draining grades as shown on the drawings. The depth of the topsoil for lawn areas after compaction shall be six inches.
 - (3) The Contractor shall provide, at his own expense, protection for all topsoil areas against trespassing and damage at all times. Damaged areas shall be treated or replaced as directed by Owner's Representative.
- B. Install irrigation system components for initial turf establishment only in accordance with the system manufacturer's instructions, as noted on the Contract Drawings, and as required by local jurisdictional regulations, to provide a fully operational system. In all cases, minimize the disturbance of previously placed materials and repair any damaged sections.
- C. If a temporary irrigation system is indicated within the Contract Drawings, it's installation shall be properly coordinated by the Contractor so as not to affect the seeding process. Temporary systems

shall remain until required stand of grass and percentage germination has been established and maintained for a minimum of two (2) weeks from initial germination.

3.04 SEEDING OPERATIONS:

A. General:

- (1) Furnish all materials required for seeding lawn areas in topsoiled areas.
- (2) Prior to seeding operations, all areas to be seeded shall be thoroughly disked or otherwise loosened to a depth of 4 inches and shall be carefully raked to true lines free from all unsightly variations, bumps, ridges or depressions, brought to finished grade elevations as shown on the drawings. All sticks, stones, roots or other objectionable material which might interfere with the formation of a finely pulverized seed bed shall be removed from the soil. Two pounds of 15-20-10 formula commercial fertilizer per cu.yd. shall be thoroughly mixed with the topsoil or not less than 10 lbs. per 1,000 sq.ft. of lawn surface, whichever is the greater.
- (3) Seeding:
 - a. Purpose: To provide permanent vegetative cover and to control storm water run-off and erosion.
 - b. Where Applicable: All areas not covered by buildings and pavement within the limit lines as shown on the contract plans, and all other existing lawn areas disturbed or damaged by the work of this contract.
- (4) All areas to be seeded in lawn shall be thoroughly disked or otherwise loosened to a depth of four (4) inches and shall be raked to true lines, free from all unsightly variations, bumps, ridges or depressions. As specified, all sticks, stones, roots or other objectionable material that might interfere with the formation of a finely pulverized seed bed shall be removed from the soil. Ground limestone, humus and commercial fertilizer shall be applied as specified:
- (5) Apply ground limestone uniformly at a minimum rate of 100 pounds per 2,000 square feet, or as determined by analysis. The ground limestone shall be distributed evenly, by machine, over all areas to be seeded. It shall be worked lightly into the top three (3) inches of the soil, at least five (5) days before applying fertilizer.
- (6) Apply fertilizer uniformly at a minimum rate of 10 pounds per 1,000 square feet. Fertilizer to be 10-10-10. Apply humus at the rate of 3-1/3 cubic yards per 1,000 square feet. Note: Application rate, sequence, and methods shall be as recommended by the manufacturer based on soil conditions of the areas of installation as tested by the Contractor, and on the intended grass stand character (i.e. turf area). The Contractor shall coordinate the review of the recommendations between the Architect, the Manufacturer, and the Contractor's Installer. Commercial fertilizer application shall be

properly coordinated with the application of any other soil amendments that may be necessary.

- (7) Work lime, fertilizer and humus into soil to a minimum depth of 3 inches using any suitable equipment.
 - (8) The soil shall then be raked to a smooth, even draining surface and properly set and compacted to establish uniform lawn/grass growth with an approved roller or as otherwise directed by the Architect. Manipulate to form, after settlement, smooth draining grades as shown on the drawings. Any depressions which occur shall be re-graded and re-rolled until a satisfactory grade is obtained.
 - (9) Time of Seeding: Grass seed shall be sown preferably in the fall between August 15th and October 1st or in the spring between April 1st and May 15th, or at such other times as are approved by Owner's Representative. All seeding is to be done in dry, or moderately dry soil and at times when the wind does not exceed a velocity of five miles per hour.
 - (10) Seed shall be sown at the rate as recommended by the supplier/manufacturer for the type of seeds used in the mix and the intended purpose of the planted area. The intent of the Restored Lawn Area seeding is to provide turf lawn to blend in with the areas adjacent to the disturbed area being planted. Supplier shall coordinate the final rate with the Architect, who shall have final authority for approval. Grass seed shall be sown in the fall from August to October, or in the spring, between March and May. Seeding shall be done in dry or moderately dry soil, and at times when the wind velocity does not exceed 5 mph. Grass seed shall be sown by approved machine in such a manner that a uniform stand will result. After seeding, the surface shall be evenly raked with a fine toothed rake and rolled with an approved roller, as directed by the Architect. Seeding by hydraulic means may be used if approval is obtained from the Architect.
- B. Hydroseeding Option: The Contractor may utilize a hydroseeding option, as indicated above. If hydroseeding shall be supplied as a zero-cost option to the Owner, the Contractor shall supply the name, address and contact information of his hydroseeding subcontractor to the Architect for contact and discussion. The hydroseed blend to be submitted by the Contractor shall be equal and comparable to the standard seed blend(s) indicated within this specification section for the intended turf establishment. The blend shall be submitted to the Architect in advance as a part of the shop drawings submittal process.

3.05 MULCHING:

- A. All seeded areas shall be covered with approved mulch not later than 3 days following seeding. Ground surfaces shall be completely covered at the rate of at least 2 tons an acre. The Contractor shall utilize a Bowie Hydromulcher or equal to apply all mulch.
- B. All areas to receive permanent seeding shall be mulched as described in the specifications and as noted herein.

- C. On slopes 4 horizontal to 1 vertical, or greater, and in drainage swales, mulch shall be anchored using erosion control blanket or other approved netting properly fastened in place. Install rolls in proper direction with overlap and staple pattern set in accordance with the manufacturer's requirements.
- D. In any event, the Contractor is responsible for mulch remaining intact until grass has germinated and has reached a minimum height of one inch.

3.06 SODDING:

- A. The Contractor shall furnish and place all materials required for sod in all topsoiled areas. The sod may be installed at any time between August 15th and June 1st when the ground is not frozen. Sod shall be placed only when weather and soil conditions are suitable for proper knitting and development of sod. Sod shall not be placed on a muddy rootzone or during periods of extreme heat. No sod shall be installed without approval of the Architect. All areas to receive sod shall be thoroughly disked or otherwise loosened to a depth of 4 inches and shall be raked to true lines free from all unsightly variations, bumps, ridges, or depressions. All sticks, stones, roots or other objectionable material which might interfere with the formation of a finely pulverized seed bed shall be removed from the soil.
- B. The sod shall be placed on a minimum of 4" of properly compacted topsoil. The sub grade of topsoil shall be graded so that after the sod is placed, the finished grade shall meet existing grades specified by the Architect. The soil shall be raked to a smooth, even-draining surface, and compacted with an approved roller as directed by the Architect/Engineer. Any depressions which occur shall be re-graded and re-rolled until a satisfactory grade is obtained.
- C. Before the sod is placed, an application of super-phosphate shall be applied to the sub-grade topsoil at the rate of 20 pounds per 1,000 square feet and raked into a depth of 1 inch.
- D. Starter Strip; The first row of sod should, if possible, be laid in a straight line with subsequent rows placed parallel and tightly against one another. Lateral joints shall be staggered to promote a more uniform growth and strength. Care shall be exercised to ensure that the sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would permit air drying of the roots. The sod shall be placed in 18" x 5' lengths and rolled with at least a 200-pound roller; as the sod is completed in any one section, the entire area shall be rolled. After rolling, the finished grade shall conform evenly to the grades on the plan or according to given grades by the Architect. The sod shall then be thoroughly watered to a depth sufficient that the underside of the new sod pad and soil immediately below are thoroughly wet.
- E. Watering During Installation: During periods of high temperature, the sod shall be lightly watered to prevent wilting during the progress of the work; as sod is completed in any one section, the entire section shall be thoroughly irrigated to a depth of 5 inches or more. In general, the sod shall be thoroughly watered until the root system has become sufficiently knit, at which time the Contractor will be relieved of his responsibility

for maintenance and watering. Watering apparatus shall then be removed by the Contractor.

- F. Joint Dressing: As soon as practical following the initial watering, but in every case prior to the second watering, the entire area shall be examined for open joints or other signs of surface imperfections. Any open joint or other voids shall be carefully filled with sand to prevent air drying of the roots and to eliminate undulations in the surface.
- G. The first mowing shall not be attempted until the sod is firmly rooted and secure in place. Not more than 40% of the grass leaf shall be removed by mowing. Grass height shall be maintained between 1-1/2" and 2-1/2" until final acceptance and completion of the whole work under this contract. Any unsatisfactory sod shall be removed and replaced at the Contractor's expense.

3.07 RECONDITIONED LAWNS

- A. Recondition existing lawn areas damaged by the Contractor's operations, including storage of materials or equipment and movement of vehicles. Also, recondition lawn areas where settlement or washouts occur or where minor regrading is required.
 - 1. Recondition other existing lawn areas.
- B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from the Contractor's operations, including oil drippings, fuel spills, stone, gravel and other construction materials, and replace with new topsoil.
- C. Where substantial lawn remains, mow de-thatch, core aerate and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. DO not use pre-emergent herbicides.
- D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation and turf, and legally dispose of it off the Owner's property.
- E. Till stripped, bare and compacted areas thoroughly to a depth of 6 inches.
- F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Provide new planting soil as required to fill low spots and meet new finish grades.
- G. Apply seed and protect with straw mulch as required for new lawns.
- H. Water newly-planted areas and keep uniformly moist until new grass is established.

3.08 WATERING

- A. The Contractor shall be responsible for the proper watering for all sodded areas until Substantial Completion of the work as hereinafter specified. The proper amount and frequency of watering will be the sole responsibility of the Contractor.

- B. In the absence of adequate rainfall, watering shall be performed daily during the first week, and shall be sufficient to maintain moist soils to a depth of at least 5 inches. Water should be applied immediately if at any time the sod shows indications of wilting.
- C. Subsequent Watering: Sod shall be watered as required to maintain adequate moisture in the upper 5 inches of soil. In the absence of rainfall, sod shall be watered at frequencies dictated by need.

3.09 CLEAN-UP

- A. Soil, manure, peat or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean. Upon completion of the planting, excess stones and debris, which has not been previously cleaned up, shall be removed from the site or disposed of as required by the Architect, except topsoil shall be spread or piled on the site as directed by the Architect. Lawns and planting areas shall be prepared for final approval.

3.10 MAINTENANCE, REPLACEMENT, GUARANTEE AND FINAL INSPECTION:

- A. Maintenance operations shall begin immediately after the seed is sown/sod installed and shall be continued as required until Substantial Completion. Grass shall be kept in healthy growing condition by mowing, watering, weeding, cultivating, disposal of waste vegetation, fertilizing, spraying or spreading of approved materials to prevent or treat infestations of insects or disease and all other operations required to produce and maintain a strong, vigorous and healthy stand of grass. Lawn areas shall be mowed to a height of 2 inches whenever the average height of grass is over 3 inches. When the amount of cut grass is heavy, it shall be removed to prevent the destruction of the underlying turf.
- B. Seeded or sodded areas that are determined to be dead within warranty period, or in the opinion of the Architect, in an unhealthy, unsightly, or badly impaired condition, shall be replaced by the Contractor as soon as reasonably possible after the unsatisfactory condition has been evident. No replacement shall be made in any season definitely unfavorable for seeding or sodding. Such replacements shall be made in the same manner as specified for the original seeding or sodding.
- C. Seeded Lawns: Seeded lawns shall be protected and maintained by watering, mowing and replacing for 60 days or as long as may be necessary to produce a uniform stand of grass. After grass is up, it shall be top-dressed with organic lawn fertilizer. Maintenance shall continue until a uniform turf is established. For the purpose of establishing an acceptable standard, scattered bare spots, none of which is larger than one square foot, will be allowed up to a maximum of 3 percent of the lawn area. Areas not meeting this requirement will be reseeded.
- D. Sodded Lawns: Sodded lawns shall be protected and maintained for 30 days or as long as necessary for the roots to be firmly established.

- E. Surface Application of Fertilizer: Spread a second application of organic lawn fertilizer at the end of the maintenance period for both seeded and sodded lawns. Spreading rate shall be as recommended by the manufacturer.
 - a. Sodded Areas: Use 18-5-9 or 12-4-8.
 - b. Seeded Areas: Use 18-5-9 or 24-6-8.
 - i. The second application of fertilizer shall be witnessed by the Owner or his representative, and a signed document shall be submitted to the Architect certifying the Work has been performed. The document shall be signed by the installer and the Owner's or Architect's witness.
- F. Provide labor and equipment for maintenance, including the necessary watering and mowing equipment to meet the requirements herein established.
 - a. The Owner will furnish the water used to maintain the lawns as specified.
- G. Turf must have had a minimum of three (3) mowings before a request for acceptance can be considered.
- H. Initial inspection of the seed or sod work to determine Substantial Completion of the work will be made by the Architect upon written notice requesting such inspection submitted by the Contractor at least 10 days prior to the anticipated date of inspection. Request may be made subsequent to the third mowing of the turf.
- I. Acceptance: After inspection, the Contractor will be notified in writing by the Architect/Engineer of Substantial Completion of all work, or, if there are any deficiencies, of the requirements for completion of the work. Work remaining to be done or redone will be subject to re-inspection before Substantial Completion is given.
- J. All seeded and sodded areas shall be guaranteed for a period of one full year / one complete growing season, commencing with the date of Substantial Completion.
- K. Upon Substantial Completion, the Owner will assume general responsibility for maintenance of the lawn areas. The Contractor shall, however, make monthly visits to the site during the guarantee period to advise the Owner of proper maintenance procedures. No additional payment shall be made for visits. Price bid for the work of this trade shall include costs of visits.
- L. Failure of the Contractor to notify the Architect/Engineer, in writing, of inadequate maintenance by the Owner of the lawn areas installed under this contract shall constitute acceptance of the Owner's maintenance operations by the Contractor. The Contractor shall not, therefore, use the Owner's alleged lack of proper maintenance as a basis for voiding his responsibilities under the guarantee herein specified.
- M. At the expiration of the guarantee period, upon written request of the Contractor, inspection for Final Acceptance will be made by the Architect/Engineer. All remedial work to turf areas by the Contractor shall be completed prior to the request for Final Acceptance.

3.11 GUARANTEE / REPLACEMENT

- A. The Contractor guarantees, by acceptance of the Contract that all work installed will be free from any and all defects in workmanship and/or materials and that all apparatus will develop capacities and characteristics specified. If, during the period of one (1) year, or as otherwise specified, from date of the certificate of completion and acceptance of the work, should any defects in workmanship, material or performance appear, he will, without cost to the Owner remedy such defects within a reasonable time to be specified in writing by the Architect. In default thereof, the Owner may have such work done and charge cost to the Contractor.
- B. The Contractor shall provide the Architect a written guarantee covering fully the one (1) year guarantee period. Lawns shall be warranted for the minimum duration of one full year, to include one full growing season after seeding and sodding, and shall be alive and in satisfactory growth at the end of the warranty period. The growing season is defined as beginning May 1 and ending October 1.
- C. At the expiration of the guarantee period, upon written request by the Contractor, inspection for Final Inspection will be made by the Architect. All remedial work to seeding by the Contractor shall be completed prior to the request for final inspection. If lawns do not show a healthy, uniform stand of grass, those areas shall be re-seeded or re-sodded as soon as conditions permit, but during the spring or fall seeding periods.
- D. Owner's Responsibility: If an area of seeding or sodding during the warranty and replacement period is found to be damaged or destroyed due to vandalism, malicious mischief, vehicle ruts and tracks, or acts of God such as flooding, storm debris, etc., then the Owner shall have the responsibility of replacing those lawn areas without cost or responsibility to the Contractor.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03300 - CAST-IN-PLACE CONCRETE WORK

PART 1 - GENERAL



1.01 GENERAL REQUIREMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SCOPE/SUMMARY

- A. In general, the extent of concrete work is shown on the drawings. Provide all labor, materials, equipment, services, and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:

1. Concrete footings, pile caps, grade beams, foundations, and walls.
2. Concrete steps, platforms, ramps, equipment pads.
3. Interior concrete slabs on grade or fill and elevated slabs.
4. Exterior concrete on grade: Curbs, walks, plazas, stairs, ramps and driveway aprons.
5. Expansion, control and isolation joints in concrete work.
6. Porous fill and vapor barrier for slabs on grade or fill.
7. Floor hardening treatment for interior exposed cement floors and base.
8. Grouting of bearing plates, leveling plates, miscellaneous lintels, and equipment supported on concrete.
9. All forms and reinforcing required for work of this section.
10. Cut, patch, finish, and point concrete and cement work.
11. Pre-molded filler at intersection of floor slabs and exterior wall, and where otherwise indicated (typical at all points abutting vertical surfaces).
12. Installation of water stop material where indicated when necessary.

- B. Work not included: The following items of related work are specified in other sections or contracts.

1. Furnishing of hanger inserts, anchors, leveling plates,

sleeves, conduits, etc.

2. Waterproofing and damp proofing.

1.03 RELATED SECTIONS

A. Related Sections:

1. 01450 - Testing Laboratory
2. 01451 - Tests, Inspections, Special Inspections, Quality Assurance Plan
3. 02105 - Stake Out
4. 02200 - Earth Work
5. 03650 - Underlayment Concrete
6. 04200 - Unit Masonry
7. 05120 - Structural Steel
8. 06100 - Rough Carpentry
9. 07190 - Under Slab Vapor Barrier
10. 07200 - Building Insulation

1.04 SUBMISSIONS

A. All submissions to be made in accordance with Section 01300 Submissions.

B. A concrete mix design: Submit laboratory test reports of concrete materials and mix design for each strength of concrete required on the project. Design data shall clearly identify the testing laboratory and provide 28 day strength testing reports representing mix proposed inclusive of all admixtures.

1. Mix design shall also include the following information;

- a. Minimum design strength intended.
- b. Cement content
- c. Water content
- d. Slag content
- e. Water cement ratio
- f. Maximum aggregate size
- g. Coarse aggregate content
- h. Fine aggregate content
- i. Air entrainment by volume
- j. Adjustment for aggregate moisture slump
- k. Tested flexural strength
- l. Tested compressive strength

2. Additional inclusions if required on job:

- a. Admixtures
- b. Water reducers
- c. Accelerators
- d. Retarders
- e. Fibers
- f. Colorants
- g. Special purpose admixtures
- h. Corrosion inhibitor
- i. Viscosity modifiers

- C. Product Data: Submit manufacturer's product data for all materials and items required for the proposed Scope of Work. Including, but not limited to: concrete mix components, reinforcement and forming accessories, wall sleeves, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, hardener/sealers, vapor barriers, non-shrink grit, etc. Product data for materials and items not listed above will be submitted upon the request of the Architect.
- D. Shop Drawings-Reinforcement: Submit complete and accurate shop drawings for approval before any work is executed. The shop drawings submitted by the Contractor shall be independently prepared for him by a Professional Engineer licensed to practice in the State of New York or otherwise within the state where the project is to be constructed and shall completely show the following:
1. Foundation plans and details, including but not limited to: pier plan details, stair sections, exterior wall elevation drawings which show all reinforcing, top of wall elevations, brick shelves & shelf elevations, tops of piers, bottom of footings, stepped footings and elevation changes, bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
 2. Floor slab plan indicating elevation variations, recesses, control joints, isolation joints, expansion joints and any proposed cold joints and details of each.
 3. Bending and tying diagrams, including typical corners,
 4. Sizes and spacing of members, relationship to contiguous work, fabrication, bending, and placement of concrete reinforcement.
 5. General notes and legends as required.
 6. Drawings shall comply with the latest version of ACI 315 Details and Detailing of Concrete Reinforcement.
 7. Any and all other pertinent information.
 8. Shop drawings must be signed and sealed by licensed professional engineer.
- E. Samples: Submit samples of materials only if requested by the Architect, including names, sources, and descriptions.
- F. Material Certificates: Provide material certificates in lieu of laboratory test reports when permitted by Architect. Material certificates shall be signed by the NYS-licensed Professional Engineer who prepared the shop drawing submittal, certifying that each material item complies with, or exceeds, specified

requirements.

G. LEED Submittals, for LEED projects submit the following:

1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements."
2. Credit MR 7: If plywood forms are used, Contractor must submit documentation that the plywood used contains no urea-formaldehyde and that the plywood meets the requirements of LEED MR Credit 7, Certified Wood, by providing wood certification documentation, including chain-of-custody documentation from the manufacturer declaring conformance with the Forest Stewardship Council (FSC) guidelines for certified wood building components.
3. Manufacturer's verification that steel reinforcement contains at least 90% combined post-consumer and post-industrial recycled content.
4. Manufacturer's verification that VOC content of interior concrete sealer is less than 250 g/L.

1.05 GENERAL REQUIREMENTS AND QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the latest version of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. Concrete Reinforcing Steel Institute (CRSI), *"Manual of Standard Practice."*
2. American Society for Testing and Materials (ASTM) Latest Versions:
 - a. ASTM C 33 *"Specification for Concrete Aggregates."*
 - b. ASTM C 39 *"Test Method for Compressive Strength of Cylindrical Concrete Specimens."*
 - c. ASTM C 42 *"Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete."*
 - d. ASTM C 94/C94 M-00 *"Standard Specification for Ready-Mix Concrete."*
 - e. ASTM C 150 *"Specification for Portland Cement."*
 - f. ASTM A 185 *"Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement."*
 - g. ASTM C 260 *"Specification for Air-Entraining Admixtures for Concrete."*
 - h. ASTM C 309 *"Specification for Liquid Membrane-Forming Compounds for Curing Concrete."*

- i. ASTM A 615 *"Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement."*

3. American Concrete Institute (ACI): Latest Versions

- a. ACI 117 *"Standard Tolerances for Concrete Construction and Materials."*
- b. ACI 211 *"Recommended Practice for Selecting Proportions Concrete."*
- c. ACI 301 *"Specifications for Structural Concrete for Buildings."*
- d. ACI 302 *"Guide for Concrete Floor and Slab Construction."*
- e. ACI 304 *"Recommended Practice for Measuring, Mixing and Placing Concrete."*
- f. ACI 305 *"Hot Weather Concreting."*
- g. ACI 306 *"Cold Weather Concreting."*
- h. ACI 315 *"Details and Detailing of Concrete Reinforcement."*
- i. ACI 318 *"Building Code Requirements for Reinforced Concrete."*
- j. ACI 347 *"Recommended Practice for Concrete Formwork."*

B. Quality Control Testing During Construction:

- 1. The Owner will employ an independent testing laboratory to perform tests and to submit test reports. The contractor will be responsible for contacting the testing laboratory to arrange for all sampling, observation and testing. The Owner will pay for all passing tests; all failed tests and any additional testing required due to failed tests will be the responsibility of the contractor.
- 2. Sampling and testing for quality control during placement of concrete shall include the following as appropriate to scope, as directed by the Architect and in coordination with Section 01451.
- 3. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge per truckload or batch of each type of concrete; additional tests when concrete consistency seems to have changed. See 2.05G for slump limits.
 - b. Air Content: ASTM C 173, volumetric method for

lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each days' placement of each type of air-entrained concrete.

- c. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens are made.
 - d. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - e. Compressive Strength Tests: ASTM C 39; one set for each day's placement exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - 1. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than five are used.
 - f. When total quantity of a given class of concrete is less than 50 cubic yards, strength test may be waived by Architect if, in his judgement, adequate evidence of satisfactory strength is provided.
 - g. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - h. At the discretion of the Architect the strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
4. Test results will be reported in writing to the 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.

5. Non-destructive Testing: Impact hammer, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
 6. 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 the 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.
- C. The Contractor shall provide a storage box to be used exclusively for the storage and curing of concrete test specimens. This box shall be substantially constructed, made of 1" thick T & G lumber, well braced to prevent warping, or 1/2" thick plywood (exterior grade) may be used. Box shall be provided with a hinged cover and padlock. Storage box shall be so constructed and located on the project site that its air temperature when containing concrete specimens will remain between 60° and 80°F. During the first 24 hours that any test specimens are in the box, electric heating cables or other approved means shall be provided to maintain this temperature during freezing weather. The storage box shall be placed on the site where approved, in location such that it will not be subject to any vibration or disturbance. Storage box shall not be placed in any building or shanty while it is being used for storing specimens.
- D. Should the average strength of the test cylinders fall below the required strength, the Architect may require changes in the proportion to apply to the remainder of the work or may require load tests and/or cores at the Contractor's expense on the portion of the structure which fails to develop the required strength or may require additional curing, the load test shall conform to the requirements of the Building Code Requirements for Reinforced Concrete (ACI 318, latest edition). If the concrete does not meet the specified requirements, the Architect may condemn such concrete already in place and the Contractor, at his own expense, shall remove such condemned concrete and replace same with new concrete to the satisfaction of the Architect. Use of high early strength cement will not be permitted without written approval of the Architect.

1.06 PROJECT CONDITIONS

- A. General: The contractor shall ensure that all proper project conditions are in place, ready for the setting of forms, reinforcement and subsequent concrete pouring, prior to the commencement of the work. Commencement of work constitutes contractor acceptance of all existing conditions.

1.07 CONTROLLED CONCRETE

- A. Concrete shall be composed of Portland Cement, fine aggregate,

coarse aggregate, and water or as otherwise composed via approved mix design.

1. Additional materials may include: slag, admixtures, fibers, colorants, or special purpose admixtures.
- B. All concrete, unless otherwise specified or called for on the drawings, shall be controlled concrete as defined and regulated in the local building code and by the American Concrete Institute and its **ultimate compressive strength at the end of 28 days shall be not less than 4,000 pounds per square inch for foundations, walls and footings, 4,500 pounds per square inch for slabs-on-ground elevated slabs, and other building concrete, and 4,500 pounds per square inch for exterior concrete including, but not limited to, sidewalks, stairs, ramps, driveway aprons and curbing, unless otherwise indicated on structural drawings.**
- C. Before the work is begun, the Contractor shall have preliminary trial tests made by a laboratory approved by the Architect to determine the mixture required to give the strength specified. Concrete shall be designed in accordance with the A.C.I. *Standard Recommended Practice for Selecting Proportions for Concrete* (ACI-513) to produce the strength required. Concrete shall be so designed that the concrete materials will not segregate nor shall excessive bleeding occur. Tests shall be made in accordance with ASTM C-39. The laboratory trial mixture for each mix design shall develop a concrete of compressive strength at 28 days of 1,200 psi higher than the required minimum for each of the strengths indicated to be acceptable for use in the field, but in no case shall cement content be less than 6 bags per cubic yard for 4,000 psi and 6 1/2 bags for 4,500 psi concrete. The proposed mixture must be approved by the Architect before the Contractor proceeds with the work.
- D. Upon approval by the Architect, the Contractor will be allowed to proceed with the work if the laboratory trial mixture develops a compressive strength of 70% of the required ultimate strength at the end of seven (7) days.
- E. If, during the progress of the work, it is found that the required workability and strength cannot be attained with the materials furnished by the Contractor, the Architect may order such changes in proportions or materials or both as may be necessary to secure the desired properties.
- F. The proportions of aggregate to cement shall be such as to produce a mixture which will work readily into the corners and around reinforcement but without permitting the materials to segregate or excess free water to collect on the surfaces. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve (fine aggregate) shall be not less than 40% or greater than 50% of the total, unless otherwise directed. Maximum size of coarse aggregate in slab, beams, and columns shall be 3/4" and in walls and footings 1 1/2".
- G. The source of supply of the aggregate shall not change during the

course of the job without previous notice to the Architect, and the materials from any new source shall be subject to acceptance or rejection based upon tests to be made by the Testing Laboratory at the Contractor's expense.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Protect materials delivered from the elements and from otherwise being damaged on site.
- B. Any materials damaged on site due to improper delivery, storage or handling shall not be incorporated in the project and shall be replaced at no cost to the Owner.
- C. Deliver, store and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to surface.
 - 1. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.

2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: All reinforcing steel shall conform to ASTM A615, Grade 60, deformed (60 KSI yield stress) and be rolled from intermediate grade new steel billets.
- B. Welded Wire Fabric: All reinforcement mesh shall be electric-welded wire fabric with an ultimate tensile strength of not less than 55,000 pounds per square inch. All reinforcement mesh shall conform to ASTM A-185.
- C. Supports for Reinforcement: Provide bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing

bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications (brick is not acceptable other than for slabs on ground).

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Precast concrete bricks are acceptable for slab on ground construction.
 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
 3. Certified copies of mill reports shall accompany all deliveries of reinforcing steel, identified to indicate the minimum yield strength of the furnished bars.
 4. Copies of the manufacturer's affidavit shall accompany all deliveries of welded wire fabric certifying its minimum tensile strength.
- D. For LEED projects all steel reinforcement to contain minimum 90% combined post-consumer and post-industrial recycled content.

2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
1. Use one brand of cement throughout the project, unless otherwise acceptable to the Architect.
- B. For LEED projects Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
1. Provide no more than 25% within the mix for use on exposed slabs on grade, elevated slabs, sidewalks, ramps and stairs.
 2. Provide no more than 40% within the mix for use on foundation walls, grade beams, piers, footings, etc.
- C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 2. 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 the Architect.
 3. Coarse aggregates for all stone concrete and fine aggregate shall conform to ASTM Designation C 33 - well graded from fine to coarse with the specified limits. The maximum size of the aggregate 3/4" in slabs, beams and columns and 1-1/2" in

walls and footings and not larger than one-fifth (1/5) of the narrowest dimension between the sides of the forms of the member for which the concrete is to be used, not larger than three-fourths (3/4) of the minimum clear spacing between reinforcing bars.

4. Coarse aggregate for stone concrete shall consist of crushed stone or natural or crushed gravel, having clean, hard, strong, uncoated particles free from injurious amounts of soft, thin, elongated, or laminated pieces, alkali, organic, or other deleterious matter.
5. Fine aggregate for stone concrete - sand, stone screenings, or other inert material with similar characteristics having clean, strong, durable, uncoated grains, and free from lumps, salt, or flaky particles, clay, shale, alkali, organic matter, or other deleterious substance.
6. Aggregates shall be graded as follows:

Coarse Aggregate

Percent Retained

1" sieve	0
3/4" sieve	0 - 10
3/8" sieve	45 - 80
No. 4 sieve	90 - 100

Fine Aggregates

By Weight Passing

Passing 1/4" square opening	100%
Passing No. 4 sieve	95 - 100%
Passing No. 16 sieve	50 - 85%
Passing No. 50 sieve	15 - 25%
Passing No. 100 sieve	2 - 8%

- D. Anti-shrinkage grout to be used for grouting in of bearing plates, anchors, and inserts shall be Master Builders "Embecco" premix or approved equal.
- E. Admixtures shall be used only with the prior written approval of the Architect. All mixtures specified herein or proposed for use by the Contractor shall be of a manufacturer as approved by the Architect and used strictly in accordance with the manufacturer's directions.
 1. A set-controlling, water-reducing admixture: "Pozzolith" manufactured by Master Builders or approved equal.
 2. Air-entraining Admixture: ASTM C-260, certified by manufacturer to be compatible with other required admixtures.
 - a. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 1. "Air-Mix"; Euclid Chemical Company.

2. *"Sika Aer"*; Sika Corporation.
3. *"MB-VR or MB-AE"*; Master Builders.
4. *"Darex AEA"* or *"Daravair"*; W.R. Grace.
5. *"Edoco 2001 or 2002"*; Edoco Technical Products.
6. *"Air-Tite"*; Gifford Hill/American Admixtures.

b. Air-entraining admixtures shall be used for all concrete exposed to weather.

F. Water: Water used in mixing concrete shall be clean, potable (drinkable), and free from injurious amounts of oils, acids, alkalis, organic materials, or other deleterious materials. (complying with ASTM C94).

2.04 RELATED MATERIALS

A. 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.

1. Polyethylene sheet not less than 8 mils thick.

B. Non-shrink Grout: CRD-C 621, factory pre-mixed grout.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

a. Non-metallic:

1. *"Set Grout"*; Master Builders.
2. *"Sonogrout"*; Sonneborn-Rexnord.
3. *"Euco-NS"*; Euclid Chemical Company.
4. *"Supreme"*; Gifford-Hill/American Admixtures.
5. *"Crystex"*; L & M Construction Chemical Company.
6. *"Sure-Grip Grout"*; Dayton Superior Corporation.
7. *"HorngROUT"*; A.C. Horn, Inc.
8. *"Five Star Grout"*; U.S. Grout Corporation.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per square yard, complying with AASHTO M 182, Class 2.

1. For LEED projects Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

a. Provide no more than 25% within the mix for use on exposed slabs on grade, elevated slabs, sidewalks, ramps and stairs.

b. Provide no more than 40% within the mix for use on foundation walls, grade beams, piers, footings, etc.

D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171:

1. Waterproof paper.

2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Liquid Membrane-Forming Curing Compound: Concrete slabs shall be cured by means of pigmented curing compound of a type not affecting adhesion of resilient flooring or other surface finish, of approved manufacture, conforming to ASTM C-309, and applied in strict accordance with manufacturer's directions. Liquid type membrane-forming curing compound complying with ASTM C 309, Type 1, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
1. Available Products: Subject to compliance with requirements, products, which may be incorporated in the work include, but are not limited to, the following:
 - a. "Masterseal"; Master Builders.
 - b. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Company.
 - c. "Ecocure"; Euclid Chemical Company.
 - d. "Clear Seal"; A.C. Horn, Inc.
 - e. "Sealco 309"; Gifford-Hill/American Admixtures.
 - f. "J-20 Acrylic Cure"; Dayton Superior.
 - g. "Spartan-Cote"; The Burke Company.
 - h. "Sealkure"; Toch Div. - Carboline.
 - i. "Kure-N-Seal"; Sonneborn-Rexnord.
 - j. "Polyclear"; Upco Chemical/USM Corp.
 - k. "L & M Cure"; L & M Construction Chemicals.
 - l. "Klearseal"; Setcon Industries.
 - m. "LR-152"; Protex Industries.
 - n. "Hardtop"; Gifford-Hill.
 2. Liquid membrane curing compounds may only be used on slabs where there is no other finish flooring material to be installed.
- F. Bonding Compound: Polyvinyl acetate or acrylic base.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. Polyvinyl Acetate (Interior Only):
 1. "Euroweld"; Euclid Chemical Company.
 2. "Weldcrete"; Larsen Products Corporation.
 - b. Acrylic or Styrene Butadiene:
 1. "J-40 Adbond Bonding Agent"; Dayton Superior Corp.
 2. "Everbond"; L & M Construction Chemicals.
 3. "Hornweld"; A.C. Horn, Inc.
 4. "Sonocrete"; Sonneborn-Rexnord.
 5. "Acrylic Bondcrete"; The Burke Company.
 6. "SBR Latex"; Euclid Chemical Company.
 7. "Daraweld C"; W.R. Grace.

- G. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," or "Class" to suit project requirements.
1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
- a. "Thiopoxy"; W.R. Grace.
 - b. "Epoxytite"; A.C. Horn, Inc.
 - c. "Edoco 2118 Epoxy Adhesive"; Edoco Technical Products.
 - d. "Sikadur Hi-Mod"; Sika Chemical Corporation.
 - e. "Euco Epoxy 452 or 620"; Euclid Chemical Company.
 - f. "Patch and Bond Epoxy"; The Burke Company.
 - g. "Concresive 1001"; Adhesive Engineering Company.
- H. Joint Fillers / Filler Strips: Joints for slabs on ground shall be formed with preformed, non-exuding bituminous fiber expansion filler, which shall extend full length and depth of slabs. Vertical expansion joints shall be constructed complete with water dams or waterstops and joint filler.
- I. Vapor Barriers: Under typical interior slabs where finished flooring does not involve wood, provide non-woven, polyester, reinforced, polyethylene coated sheet of 15 mil thickness.
1. Vapor barrier membrane must have the following properties:
- a. Permeance as tested after mandatory conditioning (ASTM E 1745 paragraphs 7.1.2-5): less than 0.01 perms (gran/ft²/hr/in-Hg).
 - b. Other performance criteria:
 - 1. Strength: Class A (ASTM E 1745).
 - 2. Minimum thickness of plastic retarder material: 15 mils.
 - c. Basis of Design: Stego Wrap 15-mil Vapor barrier by Stego Industries, LLC.
 - d. Or Architect approved equal.
- J. Vapor barrier under interior slabs where finished flooring involves wood assemblies such as gymnasium and stages provide bituminous vaporproofing/waterproofing membrane.
1. Vapor barrier must have seven-ply, weather-coated, permanently bonded, semi-flexible bituminous core board composed of a 3-ply plasmatic matrix sealed between liners of asphalt-impregnated felt and a glass mat liner. Vapor barrier shall consist of an asphalt weather coat and covered with a polyethylene anti-stick sheet. Vapor barrier shall meet or exceed all requirements of ASTM E 1993-98 and shall have the following characteristics:

- a. Minimum permeance ASTM F1429, calibrated to ASTM E96, Water Method: 0.0011 Perms.
 - b. Tensile Strength ASTM E154, Section 9: 156 LBS. force.
 - c. Puncture Resistance ASTM E154: 149 LBS. force/inch.
 - d. Pre-molded Membrane® Vapor Seal with Plasmatic Core by W.R. Meadows, W.R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338. (800) 348-5976. (847) 683-4500. Fax (847) 683-4544. Website: www.wremeadows.com.
- K. Water Stops: Provide all waterstops similar to or equal to those as produced by *Greenstreak, Inc.*, as required by the drawings, either embedded in concrete, or across and/or along the joint, to form a watertight diaphragm that prevents the passage of fluid through the joint.
- L. All other materials as hereinafter specified. All set-in-place concrete elements (i.e. - pre-fabricated water stops, cast aluminum nosings, exterior stair components, etc.) shall be installed in conformance with their associated specification sections, and/or manufacturer's installation instructions if no specification is provided and in complete coordination with the work of this Section.

2.05 PROPORTIONING AND DESIGN OF MIXES

- A. Design mix of all concrete shall provide the following properties, as indicated on the drawings and schedules:
- 1. 4,000 psi 28-day compressive strength; W/C ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).
 - 2. 4,500 psi 28-day compressive strength; W/C ratio, 0.67 maximum (non-air-entrained), 0.54 maximum (air-entrained).
 - 3. Do not air entrain concrete for trowel finished interior floors and suspended slabs, including polished concrete floors. Do not allow entrapped air content to exceed 3 percent.
- B. Stone concrete shall weigh approximately 144 pounds per cubic foot. Exterior concrete, exposed to weather, shall have a water cement ratio not to exceed 6 1/2 gallons per sack of cement and an air entraining agent approved by the Architect to be added to obtain concrete with an air content not less than 4% nor more than 6% conforming to ASTM C-175, latest edition.
- C. Prepare design mixes for each type and strength of concrete laboratory trial batch methods as specified in ACI 301. Use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

- D. Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed and accepted by the Architect.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to the Owner and as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect before using in work.
- F. Admixtures: ONLY TO BE USED WITH PRIOR WRITTEN APPROVAL OF THE ARCHITECT!
1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
 2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
 3. Use high-range water-reducing admixture in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.
 4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - a. Concrete structures and slabs exposed to freezing and thawing, de-icer chemicals, or subjected to hydraulic pressure.
 - b. 4.5 percent (moderate exposure).
5.5 percent (severe exposure) 1-1/2" maximum aggregate.
 - c. 4.5 percent (moderate exposure)
6.0 percent (severe exposure) 1" maximum aggregate.
 5. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3".
 2. Reinforced foundation systems: Not less than 1" and not more than 3".

3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.
4. Other concrete: Not less than 1" and not more than 4".

2.06 MIXING

- A. All concrete shall be machine mixed or transit mixed.
- B. Hand mixing will not be permitted unless approved by the Architect. Mixing shall conform to ASTM C-94 and ACI-304. On-site mixing will not be permitted unless approved by the Architect/Engineer.
- C. Machine mixing shall be done in an approved batch mixer. Sand and gravel shall be measured by weighing. Mixing shall be continued for at least one minute after all materials are in the mixing drum at a speed of not less than twelve nor more than eighteen revolutions per minute. The volume of the mixing materials per batch shall not exceed manufacturer's rated capacity of mixer. A water gauge shall be provided to deliver the exact predetermined amount of water for each batch. Mixing shall be continued for at least 1 minute for 1 cubic yard of concrete plus 1/4 minute for each additional cubic yard of concrete after all materials.
- D. Transit mix concrete shall conform to the specification and tests herein described and to ASTM C-94 and ACI-304, most current edition(s); and further provided that the central plant producing the concrete and equipment transporting it are, in the opinion of the Architect, suitable for production and transportation of controlled concrete. The maximum elapsed time between the time of the introduction of water and placing shall be one hour.
- E. Exterior concrete exposed to weather: Water cement ratio shall not exceed 6 1/2 gallons per sack of cement and an air-entraining agent approved by the Architect shall be added to obtain concrete with an air content not less than 4% nor more than 6% conforming to ASTM C-175, latest edition.
- F. Ready-mix Concrete: Comply with the requirements of ASTM C 94, and as specified herein.
 1. 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.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall notify the Architect, Construction Manager (when applicable) and the approved testing laboratory at least 24 hours in advance of the time he intends to use ready mixed concrete so that an inspector may be assigned to the plant to supervise the mix, and be available at the site to witness pour and sampling.

- B. With each delivery of concrete, furnish to the superintendent at the building site a delivery slip (certified by laboratory representative) showing mix, quantity of cement, fine and coarse aggregates, and water, and time of departure from the plant.
- C. Under no circumstances shall transit-mixed concrete be delivered from the plant, unless mix design has been approved by the Architect and inspector of testing laboratory. The approved plant and its operating equipment shall be under the supervision of the testing laboratory appointed by and directly responsible to the Architect.
- D. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.02 FORMS

- A. Design, erect, support, brace, and maintain form work to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.
- B. Design form work to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required in the work. Use selected materials to obtain required finishes. Solidly butt joints and provide back up at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
 - 1. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete formwork

to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, etc., or other debris just before concrete is placed. Retightening forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.03 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with a non-staining, rust preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.04 VAPOR RETARDER INSTALLATION

- A. Following leveling and tamping of granular base for slabs on grade, place vapor retarder sheeting with longest dimension parallel with direction of pour. Lap joints and seal with appropriate tape.
- B. All concrete slabs on grade or fill shall receive membrane placed on porous fill prior to placing reinforcing. Membrane shall be placed with 6" laps at ends and sides, and without tears or ruptures at the time concrete is placed thereon.
- C. Both standard vapor barrier and pre-molded membrane when applicable shall be installed in accordance with the manufacturers requirements.

3.05 PLACING OF REINFORCEMENT

- A. Comply with *Concrete Reinforcing Steel Institute's* recommended practice for "*Placing Reinforcing Bars*", for details and methods of reinforcement placement and supports, and as specified herein.
- B. All reinforcement shall be rigidly wired in place with adequate spacers and zinc coated tie chairs. Bar supports shall be not more than 4'-0" o.c. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete. Reinforcement for concrete slabs on ground or fill shall be supported on precast concrete bricks. On formwork, galvanized coated chairs or spacers shall be used.

- C. Reinforcement shall be placed so that where temperature shrinkage of bars occur, they shall be no closer to top of slab than 3/4". Coordinate with work under Electrical Contract so that conduits may be replaced to obtain this result.
- D. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers as required.
- E. All reinforcement shall be bent cold. The minimum radius of bend shall be 4 diameters for bars 5/8" round or less and 6 diameters for larger bars.
- F. Place reinforcement to obtain at least minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- G. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace overlaps with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- H. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier in accordance with manufacturer's requirements before placing concrete.
- I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coating with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- J. Zinc-Coated Reinforcement: Repair, cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.06 EXPANSION JOINTS

- A. Joints for slabs on ground shall be formed with preformed, non-exuding bituminous fiber expansion filler, which shall extend full length and depth of slabs.
- B. Vertical expansion joints shall be constructed complete with water dams or waterstops and joint filler.
- C. Joint material in exterior concrete, sidewalks, plazas, stairs, ramps, curbs, etc. shall be held 1/4" from finished surface and finished with approved traffic grade sealant.

3.07 OTHER 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 (38 mm) into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints to 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 per typical detail. 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.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construction contraction joints for a depth 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 (3.2 mm). 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- (3.2 mm-) wide joints 1" deep into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished

concrete surface where joint sealants, specified in Division 07 Section "Joint Sealant," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip section together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.08 INSTALLATION OF EMBEDDED ITEMS

- A. General: 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.
1. Install reglets to receive top edge of foundation sheet waterproofing, and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
 2. Install anchor bolts, accurately located, to elevations required.
- B. 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.

3.09 CONCRETE PLACEMENT

- A. The Contractor shall notify the Owner, the Architect, the Construction Manager (when applicable) and the testing laboratory at least 48 hours in advance of the time he intends to place concrete in order to afford them the opportunity to observe placing operations. The Contractor shall obtain the Architect's and testing laboratory's permission prior to placing concrete.
- B. All forms must be absolutely clean and free from shavings and dirt prior to starting concrete operations.
- C. Under no circumstances shall concrete be deposited in or under water, nor on muddy or frozen ground.
- D. Pre-placement Inspection: Before placing concrete, the Contractor shall inspect and complete all formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used. Protect adjacent finish materials against spatter during concrete placement.
1. Apply temporary protective covering to lower 2' of finished

walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement under any and all conditions of placement.

- E. General: Comply with ACI 304 *"Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete"* and as herein specified.
1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
 2. Before depositing new concrete against concrete which has set, the forms shall be re-tightened and the surface of the concrete placed earlier shall be thoroughly roughened, cleaned of all foreign matter and laitance, shall be slushed with water, slushed with a coat of neat cement grout, and the new concrete shall be placed before the grout has attained its initial set, or the work shall be performed in such other approved manner as will insure a thorough bonding to the work.
- F. All concrete must be placed as rapidly as possible after mixing and thoroughly spaded and rammed in place. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. All possible care is to be exercised to prevent honeycombing. Concrete shall be placed in layers not over 12" thick and shall not be dumped from height over three feet. Concrete that must be placed more than 3 feet below placement level shall be chuted at a slope of not more than 1 in 2 or deposited through elephant trunks.
- G. Concrete shall be placed in one operation up to temporary bulkheads, which shall be located, in general, at points of minimum shear.
- H. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 12" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
1. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
 2. All structural concrete shall be placed with the aid of mechanical vibrators. The vibrators shall be of a type and design approved by the Architect and shall be capable of transmitting to the concrete not less than 3,000 impulses per minute. The vibration shall be sufficiently intense to visibly affect the concrete over a radius of at least 2'-0" around the point of application but shall not be applied long enough to segregate the ingredients. Insert and withdraw

vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Enough vibration shall be used to cause all the concrete to flow or settle readily into place. The vibration shall be of internal type, applied directly to the concrete and not through the forms, except in sections too thin to permit the insertion of the internal type, in which case form vibration may be employed at the discretion of the Architect. Do not use vibrators to transport concrete inside forms.

- I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position during concrete placement operations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. For exterior placement such as sidewalks, plazas, driveway aprons, curbing and equipment pads where no vapor barrier is required, the subgrade shall be moist before placing concrete. Dry or dusty subgrades shall be moistened to a minimum depth of one inch (1") prior to placing concrete.
- J. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
 - a. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - b. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

- c. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- K. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified. Concrete placed in warm weather shall be kept well sprinkled with water for at least one week after placing, unless other approved curing methods are used. No concrete shall be placed when the atmospheric temperature is above 90°F.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 - a. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
 - 3. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions, only upon approval of the Architect.

3.10 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or by other construction, unless otherwise shown or indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, immediately following form removal and not later than one day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.
1. Combine one part Portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.
 2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off, smooth, and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 MONOLITHIC SLAB FINISHES

- 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 terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
1. After placing slabs, plane surface to tolerances for floor flatness (F_F) of 15 and floor levelness (F_L) of 13. Slope surfaces uniformly to drains where required. After leveling, while still plastic, roughen surface before final set, with stiff brushes, brooms, or rakes to provide a profile amplitude of $\frac{1}{4}$ inch (6 mm) in one direction.
- 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.
1. 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. Check and level surface plant to tolerances of F_F 18 - F_L 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular

texture.

- 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 and below wood flooring systems.
1. After floating, begin first trowel finish operation using a hand or 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 surface leveled to tolerances according to ASTM E 1155 (ASTM E1155M) for a randomly trafficked floor surface. Grind smooth surface defects which would telegraph through applied floor covering system.
 - a. Specified overall values of flatness: (F(F)35, and levelness, F(L)25, with minimum local values of flatness F(F)24 and levelness F(L)17 for slabs on grade.
 2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with either thin-set or thick-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, sidewalks, plazas, aprons, curbs and ramps, and elsewhere indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms and ramps. Apply according to manufacturer's written instructions and as follows:
1. Uniformly spread 25/100 sq. ft. (12 kg/10 sq. m) of dampened slip-resistive aggregate over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
 2. After broadcasting and tamping, apply float finish.
 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive

aggregate.

- G. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions as follows:
1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. (49 kg/10 sq. m) unless greater amount is recommended by manufacturer.
 2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
 3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.12 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. The Contractor shall continuously protect cement finish floors from damage for the duration of the work by such means as approved by the Architect and shall leave same in perfect condition to receive other floor finishes or where exposed in the finished work, they shall be in perfect condition at completion and acceptance of the building.
- 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 as appropriate to finished condition of concrete surface.
1. Provide moisture curing by following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and continuously keeping wet. Place absorptive cover to

provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture-cover curing as follows:

- a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing and sealing compound to exposed interior slabs (no other finish materials) and to exterior slabs, walks, and curbs as follows:

- a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
- b. Do not use membrane curing and sealing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, vinyl tile, linoleum, glue-down carpet, etc.), painting, and other coatings and finish materials unless otherwise acceptable to the Architect.

C. Curing Formed Surfaces: 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. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

- 1. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.

3.13 REMOVAL OF FORMS

- A. Form work not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 24 hours after placing concrete, provided concrete is sufficiently hard not to be damaged by form removal operations and provided curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete-in-place unit concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit remove of forms without loosening or distributing shores.
- B. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.14 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new form work.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms close to joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to the Architect.

3.15 SHORES AND RESHORES

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and re-shoring.
1. Do not remove shoring or re-shoring until measurement of slab tolerances is complete.
- B. In multi-story construction, extend shoring or re-shoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and re-shores to avoid damage to concrete. Locate and provide adequate re-shoring support construction without excessive stress or deflection.

3.16 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: 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 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 to template at correct elevations, complying with certified diagrams or templates of manufacturer finishing machines and equipment.
 - 1. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.
- E. Pits, Trenches, etc.: Build all pits, pit cleanouts, trap pits, trenches, curbs, and pads as required by the drawings and by job conditions.
- F. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous watertight diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- G. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.17 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
 - 1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar, 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.
 - a. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. 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.
- B. 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 or 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 agent.

1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify 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.

1. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
3. 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. Patching compounds may be used when acceptable to Architect.
4. Repair defective areas, except random cracks and single holes not exceeding 1" 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" 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 same manner as adjacent concrete.
5. Repair isolated random cracks and single holes not over 1" diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one 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.
6. Perform structural repairs with prior approval of Architect

or Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.

7. Repair methods not specified above may be used, subject to acceptance of Architect.

3.18 CUTTING, PATCHING, AND REMOVAL

- A. The Contractor shall be responsible for all cutting and patching of his work as required to accommodate work of this section and of other sections and contracts.
- B. Materials which have become damaged or have been condemned shall be removed from the site.

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK / SUMMARY:

- A. Extent of each type of masonry work is indicated on drawings and schedule.
- B. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete unit masonry.
 - 2. Brick masonry.
 - 3. Decorative concrete masonry units.
 - 4. Pre-faced concrete masonry units.
 - 5. Natural stone.
 - 6. Concrete brick.
 - 7. Mortar and grout.
 - 8. Reinforcing steel.
 - 9. Masonry joint reinforcement.
 - 10. Ties and anchors.
 - 11. Miscellaneous masonry accessories.
- C. Related Sections include the following:
 - 1. 03300 - Cast-In-Place Concrete
 - 2. 05120 - Structural Steel
 - 3. 06100 - Rough Carpentry
 - 4. 07200 - Building Insulation
 - 5. 07231 - Air / Vapor Barrier System
 - 6. 07600 - Flashing and Sheet Metal
 - 7. 07900 - Caulking
 - 8. 07910 - Joint Sealers
 - 9. 08110 - Steel Doors and Frames
 - 10. 08121 - FRP Doors and Framing
 - 11. 08211 - Flush Wood Doors
 - 12. 08360 - Upward Acting Sectional Doors
 - 13. 08520 - Aluminum Windows

1.03 DEFINITIONS:

- A. Reinforced Masonry: Masonry containing horizontal joint reinforcing and reinforcing steel in grouted cells.
- B. Multi-Wythe Masonry: Masonry wall construction containing adjacent wythes of masonry with the same unit type without a cavity.
- C. Composite Masonry: Masonry wall construction containing adjacent

wythes of masonry with different unit type without a cavity.

- D. Cavity Wall Masonry: Masonry wall construction containing adjacent wythes of masonry with different unit types separated with a continuous air space cavity in-between connected by metal ties.
- E. Structural Masonry: Masonry wall construction constructed to be the main supporting structure of other building components such as a floor or roof.

1.04 PERFORMANCE REQUIREMENTS:

- A. Provide structural unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.
- B. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.05 SUBMITTALS:

- A. All Submittals shall be made in accordance with General Conditions Section G31.
- B. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- C. Shop Drawings: Submit shop drawings for the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
 - 3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement". Show elevations of reinforced walls.
 - 4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
 - 5. Self-Adhering Sheet Flashing & Waterproofing Membranes: Detail all proposed application conditions, Submit manufacturer's data for membrane, primers, sealants, adhesives and associated auxiliary materials. Prior to commencing the Work, submit manufacturer's complete set of standard details for waterproofing systems.
- D. Samples: Submit samples of the following materials:
 - 1. Unit masonry samples in small scale form showing full extent of colors and textures available for each type of exposed masonry unit required.
 - 2. Face brick, in the form of straps of five or more bricks. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular

dimensioning is indicated.

3. Colored masonry mortar samples showing full extent of colors available.
 4. Decorative concrete masonry unit samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
 5. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.
 6. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used. Show full extent of colors available.
 7. Weep vents in color to match mortar color.
 8. Accessories embedded in masonry.
- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and submission of materials in accordance with this section have been provided for review by the Architect and approved in writing.
- F. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
1. Masonry units. Include material test reports substantiating compliance with requirements.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. Anchors, ties, and metal accessories.
- G. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, per ASTM C 780, for mortar mixes required to comply with properties specification.

2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- H. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- I. Cold-Weather Procedures: Submit a detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.06 QUALITY ASSURANCE:

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance ratings have been determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- E. Field Constructed Mock-ups: Prior to installation of masonry work, erect sample wall panels to further verify selections made under sample submittals to demonstrate aesthetic effects and set quality standards for materials and execution, as well as for color and textural characteristics of masonry units and mortar, and to represent completed masonry work for qualities of appearance, materials, and construction; build mock-ups to comply with the following requirements:
 1. Locate mock-ups on site in locations indicated or, if not indicated, as directed by the Architect.
 2. Build mock-ups for each type of exposed masonry in sizes of approximately 6' long by 4' high by full thickness, including face and back-up wythes as well as all accessories including but not limited to insulation and horizontal and vertical reinforcement.
 3. Include a sealant-filled joint at least 16 inches long in exterior wall mockups.
 4. Include through-wall flashing; with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 5. Include metal/wood studs, sheathing, veneer anchors, flashing, and

weep holes in exterior masonry-veneer wall mockup, when applicable.

6. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
7. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
8. Approval of mockups is for construction of full assembly, color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
9. Protect mock-ups from the elements with weather resistant membrane.
10. Retain mock-ups during construction as standard for judging completed masonry work. When directed, demolish mock-ups and remove from site.
11. Pre-installation Conference to be after construction of mock-up but before proceeding with masonry work. Conduct pre-installation conference at Project Site.

1.07 FIELD QUALITY CONTROL:

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
- B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:
 1. Payment for these services will be made by Owner.
 2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.
 3. Refer to Specification Sections 01450 & 01451 for additional Special Inspection requirements.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- D. Clay Masonry Unit Test: For each type of unit provided, per ASTM C 67.
- E. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140.
- F. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for mortar air content and compressive strength.
- G. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.

1.08 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver masonry materials and accessories to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, or other causes.
- C. Store masonry units and cementitious material off the ground, on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If masonry units become wet, do not install until they are dry. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.
- F. Cold-applied elastomeric membranes should be stored in closed containers outdoors. Store membrane at temperature of 40°F and above to facilitate handling. Membrane contains petroleum solvents and are flammable; do not use near open flame. Store roll materials horizontally; store adhesives and primers at temperatures of 40°F and above to facilitate handling. Keep all solvents away from open flame or excessive heat.

1.08 PROJECT CONDITIONS:

- A. Protection of Work: During construction, cover top of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - 3. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
 - 4. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
- B. Stain Prevention: Prevent grout, mortar, or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar

products with painted and integral finishes, from mortar droppings and wash down detergent.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold Weather Requirements:

1. Do not lay masonry units which are wet or frozen. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions.
2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
3. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

D. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40°F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

F. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at the time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C).

1. 40°F (4°C) to 32°F (0°C):

- a. Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C).
- b. Grout: Follow normal masonry procedures.

2. Do not heat water for mortar and grout to above 160°F (71°C).

G. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40°F (4°C) to 32°F (0°C):

- a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. 32°F (0°C) to 25°F (-4°C):

- a. Completely cover masonry with weather-resistive membrane for at least 24 hours.

3. 25°F (-4°C) to 20°F (-7°C):

- a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
- 4. 20°F (-7°C) and below:
 - a. Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.
- H. Coordination: Ensure installation continuity of the waterproofing membranes scheduled for installation throughout the scope of this section. Work shall be so scheduled as to provide a watertight seal at the end of each working day on the areas worked upon during the day.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All specific products indicated within this section are to establish a level of quality. Equivalency is permitted in accordance with General Municipal Law.

2.02 MASONRY UNITS, GENERAL:

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.03 CONCRETE MASONRY UNITS (CMU):

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Concrete Block: Provide units complying with characteristics indicated below for grade, type, face size, exposed face, and, under each form of block included, for weight classification.
 - 1. Size: Manufacturer's standard units with nominal face dimensions and thicknesses indicated on drawings.
 - 2. Type II, non-moisture controlled units.
- C. Hollow Load-Bearing Block: ASTM C 90 and as follows:
 - 1. Weight Classification: Lightweight
 - 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.

3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. All components (aggregate, cement, etc.) of CMU must be harvested within 500 miles of project site. (Required for LEED Projects only)
 5. CMU to contain 20% post-industrial recycled content, by weight. (Required for LEED Projects only)
- D. Concrete Building Brick: ASTM C 55.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2500 psi.
 2. Weight Classification: Medium weight.
 3. Size (Actual Dimensions): 3-5/8 inches wide by 3-5/8 inches high by 7-5/8 inches long.
- E. Shapes: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. **All interior outside corners of CMUs shall have a 5/8" to 1" manufactured bullnosed edge. This requirement supercedes any details which may or may not be provided in the Contract Documents. All masonry bids shall include the cost of all necessary bullnose materials, at no additional costs to the Owner.**

2.04 VENEER BLOCK:

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
1. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners, except where indicated as bullnose.
 3. Provide corner units where applicable and available.
- B. Concrete Block: Provide units complying with characteristics indicated below for grade, type, face size, exposed face, and, under each form of block included, for weight classification.
1. Types included but not limited to the following:
 - a. Split-face
 - b. Split-face center score
 - c. Smooth-cast
 - d. Split Rib
 - e. Or as indicated on the drawings.
- C. Size: Manufacturer's standard units with nominal face dimensions of 16" or 18" long x 8" high x 4" thick (15-5/8" or 17-5/8" x 7-5/8" x 3-5/8" actual).

- D. Type I, moisture-controlled units.
- E. Exposed Faces: Manufacturer's standard color and texture as selected by Architect unless otherwise indicated.
 - 1. Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture of Architect's samples.
 - 2. Where special patterns are indicated, provide units with exposed faces matching color, texture, and pattern of Architect's samples.

2.05 BRICK MADE FROM CLAY OR SHALE:

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
 - 1. Size: Provide bricks manufactured to the following actual dimensions:
 - a. Standard Modular: 2-1/4" x 3-5/8" x 7-5/8".
 - b. Or as indicated on the drawings.
 - 2. Provide special molded shapes where indicated and for application requiring brick of form, size, and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.
 - 3. For sills, caps, and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured or unfroged units with all exposed surfaces finished.
- B. Facing Brick: ASTM C 216, and as follows:
 - 1. Grade SW.
 - 2. Type FBS (normal size and color variations).
 - 3. Compressive Strength: 4,500 psi, minimum, per ASTM C 67.
 - 4. Application: Use where brick is exposed, unless otherwise indicated.
 - 5. Texture and Color: As indicated on drawings or as selected by Architect.
- C. Building (Common Brick): ASTM C 62, and as follows:
 - 1. Grade MW except Grade SW where indicated by ASTM C 62 grade requirements for applicable weathering index and exposure.
 - 2. Application: Use where brick is indicated for concealed locations.

2.06 FIRE BRICK MASONRY:

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form.
- B. Fire Brick: Provide units complying with characteristics indicated below for classification, P.C.E. rating, chemical percentage analysis, modulus of rupture, cold crushing P.S.I., porosity % and bulk density.
 - 1. Classification: ASTM C-27-98 (2013), medium duty.
 - 2. P.C.E.: Cone 29 3018 F.
 - 3. Chemical Analysis:

- a. Silica: 59.90
- b. Alumina: 32.83
- c. Iron Oxide: 1.97
- d. Titanium Oxide: 1.48
- e. Calcium Oxide: .57
- f. Magnesium Oxide: .89
- g. Sodium Oxide: .49
- h. Potassium Oxide: 1.80
- 4. Modulus of Rupture: 1000-1200 PSI
- 5. Cold Crushing: 3500-4500 PSI
- 6. Apparent Porosity: 16-19%
- 7. Bulk Density: 130-134 lbs/ft
- 8. Method of Manufacturer: Dry Press

2.07 MORTAR AND GROUT MATERIALS:

- A. General: Do not use admixtures, including coloring pigments, air entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or other admixtures unless otherwise indicated and approved by Architect.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Limit cementitious materials in mortar to portland cement and lime.
 - 3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
 - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
 - 5. All new face brick mortars shall match existing face brick mortars where restoration work is required, samples of which shall be prepared and thoroughly tested for color, density, and uniformity before submitting samples for the approval of the Architect.
- B. Option 1 - Pre-blended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.
- C. Option 2 - Manual Blend: Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.
- D. Mortar for Unit Masonry: Comply with ASTM C 270, "Standard Specification for Mortar for Unit", Masonry Proportion Specification, for types of mortar required unless otherwise indicated.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced CMU masonry, use Type S.
 - 3. For brick masonry walls above grade, use Type N.
 - 4. For exterior, above-grade, load-bearing and non-load-bearing CMU walls and parapet walls; for interior load-bearing CMU walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

5. Analysis of the existing mortar to remain is required within the contract if the type required is not clear.
- E. Portland Cement: ASTM C 150, "Standard Specification for Portland Cement", Type I, except Type III, may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
1. For colored pigmented mortars, use premixed colored masonry cements of formulation required to produce color indicated, or, if not indicated, as selected from manufacturer's standard formulations by Architect.
 2. Available Products: Subject to compliance with requirements, masonry cements which may be incorporated in the work include, but are not limited to, the following:
 - a. **"Atlas Custom Color Masonry Cement"**; Lehigh Portland Cement Company.
 - b. **"Glen-Gery Color Martar Blend"**; Glen -Gery Corporation.
 - c. **"Flamingo Color Masonry Cement"**; The Riverton Corporation.
- F. For Manually Blended Colored Mortar Use Colored Mortar Pigments (for use with veneer brick and veneer block): Use pigments complying with ASTM C979, "Standard Specification for Pigments for Integrally Colored Concrete". Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment to cement ratio of 1 to 10 by weight. Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
1. Available Products: Subject to compliance with requirements, colored mortar pigments which may be incorporated in the work include, but are not limited to, the following:
 - a. **"SGS Mortar Colors"**, Solomon Grind-Chem Services, Inc.
 - b. **"True Tone Mortar Colors"**; Davis Colors, a subsidiary of Rockwood Industries, Inc.
 - c. **"Bayferrox Iron Oxide Pigments"**; Bayer Corporation, Industrial Chemical Division.
- G. Water: Clean and potable.
- H. Hydrated Lime: ASTM C 207, "Standard Specification for Hydrated Lime for Masonry Purposes", Type S.
- I. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- J. Aggregate for Mortar: ASTM C 144, "Standard Specification for Aggregates for Masonry Mortar".
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than $\frac{1}{4}$ inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
- K. Aggregate for Grout: ASTM C 404, "Standard Specification for Aggregates for Masonry Grout".
- L. Grout for Unit Masonry: Comply with ASTM C 476, "Standard Specification for Grout for Masonry", for grout for use in construction of reinforced and non-reinforced unit masonry. (Refer to Table 1 Conventional Grout Proportions by Volume. Use grout of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

TABLE 1 Conventional Grout Proportions by Volume

Type	Parts by Volume of Portland Cement or Blended Cement	Parts by Volume of Hydrated Lime or Lime Putty	Aggregate, Measured in a Damp, Loose Condition	
			Fine	Coarse
Fine grout	1	0-1/10	2-1/4 -3 times the sum of the volumes of the cementitious materials	...
Coarse grout	1	0-1/10	2-1/4 -3 times the sum of the volumes of the cementitious materials	1-2 times the sum of the volumes of the cementitious materials

1. Use fine grout in grout spaces less than 2" in horizontal direction unless otherwise indicated.
 2. Use coarse grout in grout spaces 2" or more in least horizontal dimension unless otherwise indicated.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
 4. The compressive strength of the grout shall match the compressive strength of the masonry f'm, but not less than 2,000 psi. The compressive strength of grout so specified should be determined according to ASTM C1019 (UBC 21-18).
- M. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Available Products:
 - a. Addiment Incorporated: **Mortar Kick**.
 - b. Euclid Chemical Compnay; **Accelguard 80**.
 - c. Grace Construction Products, a unit of W.R. Grace & Co., **Morset**.
 - d. Sonneborn, division of ChemRex; **Trimix-NCA**.

2.08 FIRE WALLS:

- A. General: Comply with the referenced standards and other

requirements indicated below as applicable to each type of fire wall construction required.

- B. Provide masonry units and construction as required by Underwriter's Laboratories, Inc.; Design as indicated on the Contract Drawings.
 - 1. If no specific designs are represented on the drawings, the following designs shall be utilized:
 - a. 3-Hour Firewall - UL Design No. 904.
 - b. 2-Hour Firewall - UL Design No. 905 or UL Design No. 906.
- C. Provide complete fire wall assembly submittals independent of typical masonry submittals.
 - 1. Only eligible manufacturers with products bearing the UL mark will be accepted for use in the construction of fire walls.

2.09 JOINT REINFORCEMENT, TIES, AND ANCHORING DEVICES:

- A. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie, and anchor for size and other characteristics.
 - 1. Zinc-Coated (mill galvanized) Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 641 for zinc coating of class indicated below:
 - a. Class 1: 0.40 oz. per square foot of wire surface.
 - b. Application: Use for masonry not exposed to exterior or earth.
 - 2. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 153 for zinc coating applied after prefabrication into units.
 - a. Class B-2: 1.5 oz. per square foot of wire surface.
 - b. Application: Use for all masonry back-up exposed to exterior.
 - 3. Uncoated Steel Reinforcing Bars: Of size and locations as indicated on drawings, ASTM A615, Grade 60, deformed.
 - 4. Stainless Steel Reinforcing Bars: AISI Type 304, ASTM A580, for historical masonry reconstruction projects.
- B. Joint Reinforcement: Reinforcement to conform to Standard Specification ASTM A951 & ACI/ASCE 530 (Building Code Requirements for Masonry Structures). Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet with prefabricated corner and tee units, and complying with requirements indicated below:
 - 1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
 - 2. Wire (Carbon Steel): Pre-fabricated construction from cold-drawn steel wire conforming to ASTM A 82:
 - Tensile Strength: 80,000 psi.

Yield Point: 70,000 psi, minimum.

3. Wire Diameter for Cross & Side Rods: Provide standard weight 9 gauge (.148"), typical.
- C. Single-Wythe Masonry: Provide type as follows with single pair of side rods:
 - a. Provide Hohmann & Barnard, Inc. **#220 Ladder Mesh Reinforcement** - Ladder design with perpendicular cross rods spaced not more than 16" o.c.
 - b. Finish: Provide mill galvanized, per ASTM A 641.
- D. Multi-Wythe Masonry: Provide type as follows:
 - a. Provide Hohmann & Barnard, Inc. **#120 Ladder Mesh Reinforcement** - Ladder design with perpendicular cross rods spaced not more than 16" o.c.
 - b. Finish: Provide mill galvanized, per ASTM A 641.
- E. Masonry Joint Reinforcement for Cavity-Wall Masonry:
 - a. Provide Hohmann & Barnard, Inc. **# 270-ML Ladder Adjustable Eye-Wire Reinforcement** - Ladder design with perpendicular cross rods spaced not more than 16" o.c., Cross rods to be welded at 16" o.c; first cross rods to be welded 12" in from each end to allow for lap splices.
 - b. Finish: Provide hot-dip galvanized, after fabrication, per ASTM A 153.
- F. Steel Stud Masonry Anchor System: (Where required) Provide **X-Seal Anchor System with Byna-Lock Wire Ties**, as manufactured by *Hohmann & Barnard, Inc.*, 30 Rasons Court, Hauppauge, New York, 11788; tel (800) 645-0616; fax (631) 234-0683. website: www.h-b.com.
- G. Reinforce each course of block cut back for fire extinguisher cabinets, electrical boxes and toilet accessory type recessed items. Mortar 9 gauge reinforcing wire in joints, that is 24-inches longer than recessed opening width on both sides.
- H. All steel reinforcement to contain minimum 90 percent combined post-consumer and post-industrial recycled content. (Required for LEED Projects only)

2.10 TIES AND ANCHORS

- A. Materials: Provide ties, reinforcing and anchors, specified in subsequent articles, made from materials that comply with this article, unless otherwise indicated.
 1. Carbon Steel Wire: ASTM A 82.
 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
 3. Products meeting specified products quantities by Hohmann & Barnard, Inc. or Heckmann Building Products Inc.
 4. Anchors and ties shall be 16 inches on center each way.
 5. Horizontal reinforcing shall be 16 inches on center.
- B. Joint Stabilizing Anchors: Provide Hohmann & Barnard, Inc., **Slip-Set™**

Stabilizer joint stabilizing anchors at veneer control joints and block interior wall, running wall, corner, "Tee", and "Ell" joints.

1. Provide joint stabilizing anchors at connection of new masonry to existing masonry or concrete walls.
 2. Refer to Structural Drawings for additional requirements.
- C. Rigid Anchors: Provide Hohmann & Barnard, Inc., **#344 - Rigid Partition Anchor**, Z-Type bent steel shape 1-1/2 inches wide by 1/4 inch thick by 24 inches long or length required, with ends turned up 2 inches or with cross pins. (Rigid anchors can be used to connect T-intersections of CMU shear walls in lieu of masonry bonding or bond beams. (Used at T-intersections of other CMU walls and piers where indicated on drawings, although masonry bonding and T-shaped masonry joint reinforcement may be used.)
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M. (Rigid anchors may not be fully embedded in mortar or grout and, therefore, require a coating for corrosion protection.)
- D. Mesh Wall Ties: Provide Hohmann & Barnard, Inc., **MWT - Mesh Wall Tie**, 1/2" square x 16-gauge, by width & length required; hot dip galvanized to ASTM A153 B2 finish.
- E. Corrugated Wall Ties: Provide Hohmann & Barnard, Inc., **CWT - Corrugated Wall Tie**, 7" long x 16-gauge, or length as required; hot dip galvanized to ASTM A153 B2 finish.
- F. Beam Strap Anchors: Provide Hohmann & Barnard, Inc., **#364 Corrugated Gripstay Anchor** 1-1/4 inch x 14 gauge, by length required; hot dip galvanized to ASTM A153 B2 finish.
- G. Masonry Column Anchors: Provide Hohmann & Barnard, Inc., **#353L - Column Anchor**, 1-1/4 inch x 12 gauge, by length required; hot dip galvanized to ASTM A153 B2 finish or Hohmann & Barnard, Inc., **#354 - Notched Column Anchor (Corrugated Type)**, 1-1/2 inch x 12 gauge, by length required; hot dip galvanized to ASTM A153 B2 finish.
- H. Partition Top Anchors: Provide Hohmann & Barnard, Inc., **PTA Series Anchors - PTA 422**, 12-gauge steel plate; hot dip galvanized to ASTM A153 B2 finish.
- I. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Provide Hohmann & Barnard, Inc., **HB-200/DA-213 Adjustable Veneer Anchor**, with two stainless steel fasteners #12 diameter each.

2.11 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of dimensions indicated.

- B. **Wedge Anchors:** Anchors shall meet the physical requirements of Federal Specification A-A-1923A, Type 4. Anchors shall be non-bottom bearing type with a single piece steel expansion clip providing 360-degree contact with the base material and shall not require oversized holes for installation. Carbon steel anchors shall have an electroplated zinc finish or shall be mechanically galvanized in accordance with ASTM B695, Class 55, Type 1, as appropriate. Stainless steel anchors shall be type 303, 304 or 316. Anchors shall have an evaluation report issued by ICC-ES and have been tested in accordance with ICC-ES AC01 for all mandatory tests and including the following:

1. Seismic tension & shear
2. Combination of tension and shear loads
3. Critical and minimum edge distance

Unless otherwise noted, wedge anchors shall be **"Wedge-All" Wedge Anchors** by Simpson Strong-Tie (ICC-ES ESR-1396).

- C. **Sleeve Anchors:** Anchors shall meet the physical requirements of Federal Specification A-A-1922A. Anchors shall be non-bottom bearing type with a single piece steel expansion sleeve providing 360-degree contact with the base material and shall not require oversized holes for installation. Carbon steel anchors shall have an electroplated zinc finish. Stainless steel anchors shall be type 304. Anchors shall have been tested in accordance with ICC-ES AC01 for the following:

- D.
1. Static Loads
 2. Critical and minimum edge distance and spacing

Unless otherwise noted, sleeve anchors shall be **"Sleeve-All" Sleeve Anchors** by Simpson Strong-Tie.

- E. **Postinstalled Veneer Anchors For Reconstruction Work:** Provide chemical anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. **Corrosion Protection:** Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.12 CONCEALED FLASHING MATERIALS:

- B. **Thru Wall Flashing Membrane** (where so noted on the drawings):

1. **Through-wall Flashing Membrane** (Self-Adhering) shall be **Blueskin® TWF**, an SBS modified bitumen, self-adhering sheet membrane complete with a yellow engineered thermoplastic film; as manufactured by Henry Company, 909 North Sepulveda Blvd. Suite 650, El Segundo, CA, 90245; tel. (800) 598-7663; email: techservices@henry.com. Provide pre-fabricated inside & outside corners and end dams mitered and fully adhered, including **Stainless Steel 3" Drip Plate** and all required bonding accessories as standard to Base Bid. Provide pre-formed drip plate inside and outside corners with smooth uninterrupted hemmed drip edge.

Membrane shall have the following physical properties:

- a. Membrane Thickness: 0.0394 inches (40 mils),
- b. Film Thickness: 4.0 mils,
- c. Flow (ASTM D5147): Pass @ 212 degrees F,
- d. Puncture Resistance: 134 lbf to ASTM E 154,

- e. Tensile Strength (film): 5000 psi minimum ASTM D 882,
- f. Tear Resistance: 45lbs.-MD, 17lbs.-CD to ASTM D1004,
- g. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

C. Sheet Metal Counter Flashing (where so noted on the drawings): Fabricated from the following metal complying with requirements specified in Division 7 Section "Flashing and Sheet Metal" and below:

1. Copper: 7 oz. weight copper fabric flashing as manufactured by York for fully concealed flashing, and 16 oz. weight copper for cap flashing. Provide copper flashing where sloped glazing occurs.
2. At parapet cap stones use 16 oz. copper dove-tail flashing manufactured by Cheney Flashing Company.
3. Fabricate through-wall metal flashings with deformation in both directions for integral mechanical mortar bond.
4. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Flashing and Sheet Metal".

2.13 TRANSITION MEMBRANES: (where so noted on the drawings)

- A. Primary sheet air/vapor barrier membrane shall be **Blueskin® SA**, an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film; as manufactured by Henry Company, 909 North Sepulveda Blvd. Suite 650, El Segundo, CA, 90245; tel. (800) 598-7663; email: techservices@henry.com.
- B. Primer: Primer for self-adhering membranes at temperatures above 25°F shall be Aquatac™ Primer manufactured by Henry, a polymer emulsion based adhesive, quick setting, having the following physical properties:
1. Color: Aqua.
 2. Weight: 8.7 lbs/gal.
 3. Solids by weight: 53%.
 4. Water based, no solvent odors.
 5. Drying time (initial set): 30 minutes at 50% RH and 70°F.

2.14 MISCELLANEOUS MASONRY ACCESSORIES:

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Preformed Control Joint Strips: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Control Joint Block Shear Connector: Provide sash block either side of control joint and insert Hohmann & Barnard, Inc. **RS Series - Rubber Control Joint** in joint full height.
- E. Control Joint Foam (Mortar Excluding) Filler: Provide Hohmann &

Barnard, Inc., **NS - Closed Cell Neoprene Sponge** expansion joint in veneer control joints held back for bond breaker and sealant. Apply sealant at cavity face of block prior to applying vapor barrier to make building airtight.

1. Compressible Control Joint Foam Filler: Provide Hohmann & Barnard, Inc., **NS - Closed Cell Neoprene Sponge** with adhesive backing under shelf angles to allow for vertical veneer movement. Hold back for sealant and bond breaker.

F. Weepholes: Provide the following for weepholes:

1. Full Head Joint Weep Holes: Provide a full height open cell weep hole at base of wall above flashing and above steel lintels provided with thru-wall flashing.
2. Weep Vents (Top of Wall): Available Products; subject to compliance with requirements, weephole/ventilators which shall be incorporated in the work include, but are not limited to, the following:
 - a. "Hohmann and Barnard" No. 343, No. 343W Louvered Weep Hole. For use with Standard white and grey mortar.
 - b. "Hohmann and Barnard" No. QV-Quadrovent. For use with colored mortars. Color as selected by Architect.

G. Cavity Drainage Material: Free-draining mesh, made from high density polyethylene strands (1" x 10" x 60") that will not degrade within the wall cavity; 90% open mesh weave.

1. Provide the following configuration:
 - a. Strips, full-depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.
2. Products:
 - a. Mortar Net USA, Ltd.; "Mortar Net"
 - b. Hohmann and Barnard; "Mortar Trap"

H. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

1. Available Products:
 - a. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.15 INSULATION:

A. Cavity wall closed cell expanded polystyrene insulation as indicated on drawings and specified in related sections. Refer to Specification Section 07219. Thickness as indicated on drawings.

1. Cavity wall assembly will utilize continuous rigid board cavity insulation adhered to CMU with all joints and penetrations sealed with spray foam sealant.

2.16 MASONRY CLEANERS:

- A. Acidic Cleaner: Manufacturer's standard strength general purpose cleaner designed for new masonry surfaces of type indicated; composed of blended organic and inorganic acids combined with special wetting systems and inhibitors; expressly approved for intended use by manufacturer of masonry units being cleaned.
 - 1. Available Products: Subject to compliance with requirements, a product which may be used to clean unit masonry surfaces includes, but is not limited to, the following:
 - a. "Sure Klean" No. 600 Detergent; ProSoCo, Inc.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Contractor shall examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Prepare written report, endorsed by Installer, listing any conditions requiring correction prior to performance of work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Commencement of installation indicates acceptance of conditions preovied.

3.02 INSTALLATION, GENERAL:

- A. Do not wet concrete masonry units.
- B. Cleaning Reinforcing: Before placing, remove loose rust, ice, and other coatings from reinforcing.
- C. Thickness: Build cavity and composite walls, and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.
 - 1. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
 - 2. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
 - 3. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.

- D. Matching Existing Masonry Work: Match coursing, bonding, color, and texture of new masonry work with existing work unless otherwise indicated or if there is a unit size different or joint thickness variation. Tooth-in new masonry when tying into existing unless otherwise indicated on the drawings.
- D. Tuck Pointing: Mortar shall be pre-hydrated. The specified ingredients shall be mixed with only enough water to produce a damp mass of such consistency that it will retain its form when pressed into a ball by the hands but will not flow under the trowel; then allowed to stand for not less than 1 hour nor more than 2 hours and remixed at once with the addition of enough water to produce satisfactory workability for immediate use. Tuck pointing is intended for use in repair work.
- F. Select and arrange units for exposed brick unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed unless otherwise specifically indicated on documents.

3.03 CONSTRUCTION TOLERANCES:

- A. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
- B. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed 1/4" in 10", or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, or 1/2" in 40' or more. For vertical alignment of head joints, do not exceed plus or minus 1/4" in 10', 1/2" maximum.
- C. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls, do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.
- D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".
- E. Variation In Mortar Joint Thickness:
 - 1. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 - 2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
- F. Variation In Face Dimensions: For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- G.

- H. Variation In Alignment: For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.04 LAYING MASONRY WALLS:

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half size units at corners, jambs, and, wherever possible, at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond: Lay exposed masonry in the bond pattern shown, or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back ½-unit length in each course; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
1. Fill space between hollow metal frames and masonry solidly with mortar unless otherwise indicated.
 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
 3. Fill cores in hollow concrete masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- F. Build non-load-bearing interior partitions full height of story to within 1" of underside of solid floor or roof structure above, unless otherwise indicated. Coordinate this work with all required firestopping requirements.
1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.
 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section "Fire-Resistive Joint Systems."
- G. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes.

1. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
2. If construction sequence does not allow simultaneous construction of intersecting or abutting walls, provide mesh wall ties @ 16" o.c. vertical install in initial wall and leave hanging out for incorporation into secondary wall.

3.05 MORTAR BEDDING AND JOINTING:

- A. Lay solid masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and place units. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.
- E. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- F. Interior Exposure Joints: Provide concave joints horizontal and vertical.
- G. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.06 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

- A. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.
- B. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
 1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.
- C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes.
 1. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
 2. If construction sequence does not allow simultaneous construction of intersecting or abutting walls, provide mesh wall ties @ 16" o.c. vertical install in initial wall and leave hanging out for

incorporation into secondary wall.

3.07 COMPOSITE MASONRY:

- A. Bond wythes of composite masonry together using one of the following methods:
 - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 - 2. Masonry Joint Reinforcement: Installed in horizontal joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
- B. Bond adjacent wythes of composite masonry together using full collar joints.
- C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
- D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.
 - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
- E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
 - 1. Provide individual metal ties not more than 16 inches o.c.
 - 2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
 - 3. Provide rigid metal anchors not more than 24 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.
 - 4. If construction sequence does not allow simultaneous construction of intersecting or abutting walls, provide mesh wall ties @ 16" o.c. vertical install in initial wall and leave hanging out for incorporation into secondary wall.

3.08 CAVITY WALLS:

- A. Tie wythes of cavity walls together using one of the following methods:
 - 1. Ladder Type Pintel & Eye Joint Reinforcement: Installed in horizontal

mortar joints where bed joints of both wythes align, use adjustable (two piece) ladder-type reinforcement on back-up masonry with pintel & eye extending across cavity securing veneer.

2. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.

3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

- B. Attempting to remove mortar fins from cavity or to trowel them flat against brick usually results in increased mortar droppings at base of cavity; keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavity flush. Bevel beds away from cavity, to minimize mortar protrusions into cavity.
- C. Provide weepholes (full head open cell joints) in exterior wythe of cavity wall located immediately above ledges and flashing, spaced 24" o.c., unless otherwise indicated.
- D. Provide weep vents in exterior wythe of cavity wall located at top of cavity walls at 24" o.c., unless otherwise indicated.

3.09 CAVITY WALL INSULATION:

- A. Cavity insulation shall be installed continuously between lines of horizontal joint reinforcement butting edges flush. Adhere to back-up block and seal all joints with adhesive/sealer compatible with insulation, product as recommended by the insulation manufacturer.
- B. Refer to Division 7 Section 07219 "Building Insulation" & Section 07231 "Air/Vapor Barrier System" for installation requirements applicable to continuous rigid insulation.
- C. Provide insulation thickness as indicated on drawings.

3.10 HORIZONTAL JOINT REINFORCEMENT:

- A. General: Provide continuous horizontal joint reinforcements as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".
- B. Cut or interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.
- D. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections.

- E. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
1. Space continuous horizontal reinforcement as follows:
 - a. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcement acts as structural bond or tie between wythes, space reinforcement as required by code but not more than 16" o.c. vertically.
 - b. For foundation and parapet walls, space reinforcement at 8" o.c. vertically unless otherwise indicated.
 2. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.
 - a. In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

3.11 CONTROL AND EXPANSION JOINTS:

- A. General: Provide vertical and horizontal expansion, control, and isolation joints in masonry where shown. Build-in related items as the masonry work progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
1. Build-in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting non-metallic compressible joint filler of width required to permit installation of sealant and backer rod.
 - a. Locate horizontal pressure relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.
 5. Build in vertical pressure relieving joints. Expansion joints shall be located in sizes and locations as shown on drawings.
 6. Vertical control joints: unless otherwise noted, control joints shall be located as shown on drawings and/or in accordance with the ACI guidelines and specified herein. Location of all control joints shall be reviewed by Architect prior to proceeding with work.
 - a. Vertical interior and exterior masonry control joints shall be ½" wide and filled with appropriate caulk.
 - b. Control joint spacing for exterior and interior walls:

<u>Wall Height (FT)</u>	<u>Horizontal Joint reinforcing 16" O.C.</u>
Up to 8 feet	25 ft O.C.
8ft to 12 ft	30 ft. O.C.
Over 12 ft.	35 ft. O.C.
 - c. Control joints for interior and exterior masonry shall be located at the following points of weakness or high stress concentrations:

1. At all abrupt changes in wall height.
 2. At all changes in wall thickness, such as those at pipe or duct chases and those adjacent to columns or pilasters.
 3. Above joints in foundations and floors.
 4. Below joints in roof and floors that bear on the wall.
 5. At a distance of not over one-half the allowable joint spacing from bonded intersections or corners.
 6. At one or both sides of all door and window opening unless other crack control measures as used, such as joint reinforcement or bond beams.
- B. Control joints in 2 hour fire rated CMU walls shall be as follows: Joint size maximum $\frac{1}{2}$ " with nominal $\frac{3}{4}$ " diameter polyethylene backer rod compressed and installed into joint with minimum of $\frac{1}{4}$ " thick fill materials applied within the joint flush with both surfaces of the wall as manufactured by "3M Company" - model # FD-150+. Note: All installations shall be in accordance with UL guidelines for joint systems.

3.12 ANCHORING MASONRY TO STRUCTURAL MEMBERS:

- A. Anchor masonry to structural members as detailed and indicated within the Construction Documents or where masonry abuts or faces structural members to comply with the following:
1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.
 4. Coordinate anchors with flashing and air/vapor barrier requirements. Seal any penetrations necessary in flashing and air/vapor barriers.

3.13 LINTELS:

- A. Install steel lintels of size and configuration shown where indicated in Construction Documents. Provide galvanized steel lintels at all exterior conditions where exposure to moisture is possible.
- B. Provide minimum bearing of 6" at each jamb unless otherwise indicated.

3.14 FLASHING OF MASONRY WORK:

- A. Refer to Division 7 Section 07231 "Air/Vapor Barrier System" for installation requirements applicable to through wall flashing.
- B. General: Provide concealed self-adhering through wall flashing in masonry work continuous at base of wall at or above shelf angles,

lintels, ledges, and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior.

1. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Seal penetrations in flashing with mastic before covering with mortar.
2. Place horizontal leg of through wall flashing on sloping bed of mortar and cover with mortar. Set stainless steel drip plate into minimum of $\frac{1}{4}$ " bead of water block sealant, apply spray primer and allow to dry 4 to 5 minutes; within 30 minutes of setting primer set self-adhering through wall flashing onto drip plate set back from face of exterior face of masonry.
3. Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end then provide end dams at lintels and sills. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up typically two full cmu back-up courses (16") but a minimum of 4" where restricted, and through the inner wythe to within $\frac{1}{2}$ " of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan.
4. Install flashing to comply with manufacturer's instructions.
5. Provide fully open cell weep hole head joints of the first course of masonry immediately above concealed flashings. Space 24" o.c. unless otherwise indicated.
6. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.
7. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Cavity Drainage Material" Article.
8. Install vents in head joints at top course of just below or where indicated in exterior wythes at spacing indicated or 24" o.c. Use specified weep/vent products to form vents.
 - a. Close cavities off vertically and horizontally with treated wood blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.15 INSTALLATION OF REINFORCED UNIT MASONRY:

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602. Place reinforcement of size and type and spacing as indicated in structural drawings.

- C. Grouting: Grout reinforced cores full height in coordination with and as indicated on structural drawings. Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches.
 - 3. The use of mortar to fill the cells is not permissible.

3.16 INSTALLATION OF SELF-ADHERING TRANSITION MEMBRANES:

- A. Refer to Division 7 Section 07231 "Air/Vapor Barrier System" for installation requirements applicable to self-adhering transition membranes.
- B. General: Provide self-adhering transition membranes locations including window & door openings, top of wall covering wood blocking tied into roofing, changes in materials, across expansion joints, around penetrations, structural steel exposed within the cavity and wherever indicated on the construction documents.
 - 1. Coordinate installation of transition membranes with other materials utilized as part of the air/vapor barrier system utilizing compatible products.
 - 2. Install transition membranes to comply with manufacturer's instructions.

3.17 REPAIR, POINTING, AND CLEANING:

- A. Remove and replace masonry units which are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weepholes, and completely fill with mortar. Point up all joints including corners, openings, and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly sets and cured, clean masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of installed masonry.
 - 3. Fully clean installation of exterior masonry with specified cleaner; apply and rinse, remove in accordance with manufacturer instructions.
 - 4. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent,

polyethylene film, or waterproof masking tape.

5. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 6. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner as indicated in Part 2 "Masonry Cleaners" Article.
 7. Clean exterior finished concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.
- E. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion. Protect waterproofing membrane and drain board work from other trades during construction. Backfill with specified materials, protect membrane from damage.

3.18 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, recycle or remove all surplus materials from the Project site(s).

END OF SECTION

DIVISION 5 - METALS

SECTION 05400 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.01 GENERAL:

- A. Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of cold formed framing as indicated on the drawings and specified herein. Shapes, sizes and accessories as specified and detailed shall establish the type of units and materials to be used to provide the functional and finished aesthetic requirements desired.
- B. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SUMMARY:

- A. Extent of cold-formed metal framing is shown on drawings.
- B. Types of cold-formed metal framing units include the following:
 - 1. "C" shaped load bearing and non-load bearing steel studs.
 - 2. "C" shaped steel joists.
 - 3. Track Sections
 - 4. Hat Channels
 - 5. Clip Angles
- C. Related Sections include the following:
 - 1. Section 03300 - Concrete
 - 2. Section 04200 - Unit Masonry
 - 3. Section 05120 - Structural Steel
 - 4. Section 05500 - Miscellaneous Metal
 - 5. Section 06100 - Rough Carpentry
 - 6. Section 06200 - Finish Carpentry
 - 7. Section 07200 - Building Insulation
 - 8. Section 09250 - Gypsum Wallboard

1.03 REFERENCES:

- A. AISI - Specification for the design of cold-formed steel structural members, code of standard practice (COSP).
- B. ASCE 7 - Minimum design loads for building or other structures.
- C. ASTM A90 - Standard test method for weight (mass) of coating on iron and steel articles with zinc or zinc alloy coatings.
- D. ASTM A370 - Standard test methods and definitions for mechanical testing of steel products.

- E. ASTM A653 - Standard specification for steel sheet, zinc coated (galvanized) or zinc iron alloy coated (galvannealed) by the hot-dip process.
- F. ASTM A780 - Standard practice for repair of damaged and uncoated areas of hot-dip galvanized coatings.
- G. ASTM A924 - Standard specification for general requirements for steel sheet, metallic coated by the hot-dip process.
- H. ASTM A1003 - Standard specification for steel, sheet, cold rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability.
- I. ASTM A1008 - Standard specification for steel, sheet and strip, hot rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability.
- J. ASTM 1011 - Standard specification for steel, sheet and strip, hot rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability
- K. ASTM B633 - Standard specification for electrodeposited coatings of zinc and iron on steel.
- L. ASTM C754 - Specification for installation of framing members to receive screw attached gypsum wallboard, backing board or water resistant backing board.
- M. ASTM C840 - Standard specification for application and finishing of gypsum board.
- N. ASTM C955 - Standard specification for load bearing (transverse and axial) steel studs, runners (tracks), and bracing or bridging for screw application of gypsum panel products and metal plaster bases.
- O. ASTM C1007 - Standard specification for installation of load bearing (transverse and axial) steel studs and related accessories.
- P. ASTM C1513 - Standard specification for steel taping screws for cold formed steel framing connections.
- Q. ASTM E84 - Standard test method for surface burning characteristics of building materials.
- R. ASTM E90 - Method for laboratory measurement of airborne sound transmission loss of building partitions.

1.04 DESIGN REQUIREMENTS:

- A. Fire Resistive Rating: Where fire rated construction is indicated on drawings, provide materials and construction that are identical to those assemblies whose fire resistance rating has been determined per ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
 - 1. Meet or exceed fire resistance requirements outlined under provisions of the GA-600 Fire Resistance Design Manual for wall and ceiling assemblies.
 - 2. Meet or exceed flame/fuel/smoke requirements of ASTM E84 surface burning characteristics for finish materials
- B. Sound Transmission Characteristics: For specified wall assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and

classified according to ASTM E413 by a qualified independent testing agency.

- C. AISI Specifications: Comply with AISI's current 'Specification for the Design of Cold-Formed Steel Structural Members' and the following for calculating structural characteristics of cold formed metal framing:
 - 1. CCFS Technical Bulletin: Current 'AISI Specification Provisions for Screw Connections'.
- D. Fire Rated Assemblies: Where framing units are components of the assemblies indicated for a fire resistance rating, including those required for compliance with governing regulations, provide units which have been approved by governing authorities.

1.05 SUBMISSIONS:

- A. All submissions shall be made in accordance with Section 01300 Submissions.
- B. Product Data: Submit manufacturers data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations
 - 2. Storage and handling requirements and recommendations
 - 3. Installation methods
- C. Structural Calculations (For Structural Load Bearing or Supporting Assemblies):
 - 1. Submit structural calculations prepared by manufacturer for approval. Submittal shall be sealed by a Professional Engineer registered in the state of the project
 - 2. Description of design criteria
 - 3. Engineering analysis depicting stress and deflection (stiffness) requirements for each framing application
 - 4. Selection of framing components, accessories and welded connection requirements
 - 5. Verification of attachments to structure and adjacent framing components
 - 6. Engineer shall have a minimum of five (5) years experience with projects of similar scope
- D. Shop Drawings (For Structural Load Bearing or Supporting Assemblies):
 - 1. Submit shop drawings prepared by the manufacturer showing plans, sections, elevations, layouts, profiles and product components locations, including anchorage, bracing, fasteners, accessories and finishes.
 - 2. Show connection details with screw types and locations, weld lengths and locations and other fastener requirements.

3. Where prefabricated or prefinished panels are to be provided, provide drawings depicting panel configurations, dimensions and locations
- E. Welders Certificates: Submit manufacturers certificates, certifying welders employed on work, verifying AWS qualifications within the previous 12 months.
- F. Mill Certificates: Signed by steel sheet producer indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coating thickness.

1.06 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Materials shall be provided by a firm that is experienced in manufacturing cold-formed metal framing similar to that indicated for this Project and with a record of successful in-service performance.
 1. Assumes responsibility for designing cold-formed metal framing and connections to comply with performance requirements. This responsibility includes preparation of Shop Drawings and design calculations by a qualified professional engineer.
- B. Installer Qualifications: Work shall be installed by an experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Professional Engineer Qualifications: A professional engineer who is licensed to practice in the jurisdiction where project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent. Engage a qualified Professional Engineer to prepare design calculations, shop drawings and other structural data.
- D. Mock-Up: When requested by the Architect or owner, contractor shall provide a 4'x4' mock-up for evaluation of workmanship for each type of cold formed metal framing specified/required by the project.
 1. Construct areas designated by Architect.
 2. Do not proceed with remaining work until material, details, and workmanship are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.
 4. Demolish mock-up at a time as a designated by the Architect.

1.07 DELIVERY, STORAGE, and HANDLING:

- A. Store products in manufacturers unopened packaging until ready for installation.
- B. Store materials protected from exposure to rain, snow or other harmful weather conditions, at temperature and humidity conditions per AISI COSP Section F3.

1.08 Project Conditions:

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturers absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Marino/WARE
 - 2. Clark Steel Framing Systems.
 - 3. Dietrich Metal Framing.

2.02 METAL FRAMING:

- A. System Components: With each type of metal framing required, provide manufacturer's standard U-shaped steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.
- B. Materials and Finishes:
 - 1. For 16-gauge and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi; ASTM A 446, A 570, or A 611.
 - 2. For 18-gauge and lighter units, which will only be attached mechanically, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 37,000 psi; ASTM A 446, A 570, or A 611.
- C. Provide galvanized finish to metal framing components complying with ASTM A525 for minimum G90 coating.
 - 1. Finish of installation accessories to match that of main framing components, unless otherwise indicated.

- D. "C"-shaped Studs: Manufacturer's standard load-bearing steel studs of size, shape, and gauge indicated, with 2" flange and flange return lip.
- E. Punched Channel Studs: Manufacturer's standard factory-punched, load-bearing steel studs of size, shape, and gauge indicated, with 1.375" flange.
- E. Hat Shaped Furring Channels: 22 gauge with minimum 1/2" wide flanges. Minimum depth 3/4" unless otherwise noted on drawings.
- F. Joists: Manufacturer's standard C-shape sections of size, shape, and gauge indicated.
- G. Framing Accessories:
 - 1. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength equal to that of main components.
 - 2. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - a. Supplementary framing.
 - b. Bracing, bridging and solid blocking.
 - c. Web stiffeners.
 - d. End clips.
 - e. Gusset plates.
 - f. Stud kickers, knee braces and girts.
 - g. Hole reinforcing plates.
 - h. Backer plates.

2.03 FABRICATION:

- A. General: Framing components may be prefabricated into panels prior to erection. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.
 - 1. Fabricate framing assemblies in jig templates to hold members in proper alignment and position and to assure consistent component placement.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator.
 - 4. Fasten other materials to cold-formed metal framing by welding, bolting or screw fastening, according to shop drawings.
- B. Mechanical Fasteners: ASTM C1513, corrosion resistant coated, self-drilling, self-tapping steel drill screws. Minimum two (2) screws per connection.

- C. Fabrication Tolerances: Fabricate assemblies level, plumb and true to line, to a maximum allowable tolerance variation of 1/8 inch in 10 feet, and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.
- D. Reinforce, stiffen and brace framing assemblies to withstand handling, delivery and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

- A. Pre-installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
1. Verify that concealed wood/sheet steel blocking has been installed the proper locations.
- B. Examine substrates to which metal framed construction attaches or abuts. Verify pre-set hollow metal frames, cast in anchors, and structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of wall framing.
- C. Preparation: Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.02 INSTALLATION, GENERAL:

- A. Manufacturer's Instructions: Install metal framing systems in accordance with ASTM C 1007 and manufacturer's printed or written instructions and recommendations, unless otherwise indicated.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners. Provide fasteners at corners and ends of tracks.

1. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
 2. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
 3. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim, and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- C. Installation of Wall Stud System: Secure studs to top and bottom runner tracks by screw fastening at both inside and outside flanges.
1. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
 2. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of the stud system. Independently frame both sides of joints.
 3. Install horizontal stiffeners in the stud system, spaced (vertical distance) at not more than 4'-6" o.c. Mechanically fasten at each intersection.
 4. Fasten hole reinforcing plates over web penetrations that exceed the size of the manufacturer's standard punched openings.
- D. Erection Tolerances: Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true to line joints.
1. Step in face and jog in alignment between panels not to exceed 1/16".
- E. Insulation: Install insulation in exterior framing members, headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

3.03 REPAIRS AND PROTECTION:

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings and all welded areas on fabricated and installed cold-formed metal framing with galvanized repair paint, according to ASTM A 780 and manufacturer's written instructions. Wire brush slag off of all welds.

END OF SECTION

DIVISION 5 - METALS

SECTION 05500 - MISCELLANEOUS METAL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide all miscellaneous metal and metal fabrications, complete and installed, as shown on the Drawings, specified herein, or needed for a complete and proper installation of all building components, which may not be specifically called for under other sections of these Specifications.
- B. Related Sections:
 - 1. Section 04200 - Unit Masonry
 - 2. Section 05120 - Structural Steel
 - 2. Section 05210 - Steel Joists and Girders
 - 3. Section 05300 - Metal Decking
 - 4. Section 05400 - Cold-Formed Metal Framing
 - 5. Section 05512 - Wrought-Iron Railings
 - 6. Section 05514 - Steel Railings
 - 7. Section 05516 - Aluminum Railings

1.02 QUALITY ASSURANCE

- A. Standards: Comply with standards specified herein and as listed in Section 01085 - Applicable Standards.
- B. Qualifications of Personnel: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- C. Welding: Perform all shop and field welding required in connection with the work of this Section, adhering strictly to the current pertinent recommendations of the American Welding Society.

1.03 SUBMISSIONS

- A. Comply with provisions of Section 01300 and as modified below.
- B. Product Data:
 - 1. Complete materials list of all items proposed to be furnished and installed under this Section.
 - 2. Manufacturers' product data, specifications, and other data required to demonstrate compliance with specified requirements.
- C. Shop Drawings: The Contractor shall prepare and submit shop

drawings covering all items of work of this section. The drawings shall show all dimensions and details of construction, installation and relation to adjoining and related work where same requires cutting or close fitting, and shall show all reinforcement, gauges of metal, anchorage, reinforcing, and other work required for complete installation.

1. Provide templates for bolts and/or anchorage installation by other trades.

1.04 COORDINATION

- A. All work under this section shall be properly coordinated with the work of other sections and contracts which affects or is affected by work of this section. To this end, close cooperation shall exist between trades and/or Contractors installing other work in any way affecting or affected by work under this section.
- B. Shop drawings shall be exchanged between the trades and/or Contractors so affected to the end that all work shall properly receive or be received by work under other sections, and the entire operation shall be a harmonious whole.

1.05 WORKMANSHIP AND INSTALLATION

- A. All work included under this section shall be installed by the contractor at the proper time, and as rapidly as progress of the adjacent and connecting work will permit. All work to be set by others shall be delivered when required by them. The Contractor shall consult with the various other contractors installing adjoining work regarding the methods to be employed in connecting the several materials. Holes and connections for the work of other trades shall be provided as necessary.
- B. All work shall be erected and secured plumb and true to line, and finished smooth and clean from fine and noticeable irregularities or file marks. Ferrous metals entering or adjoining exterior masonry surfaces shall be insulated from it with lead shields and by an approved non-staining elastic cement of approved color.

1.06 VERIFYING CONDITIONS

- A. Verify all measurements in the field, as required, for work fabricated to fit conditions at the building. Before starting work, examine all adjoining work on which the work of this section is in any way dependent for perfect workmanship and fit. Do such corrective work to adjoining work as may be necessary to make the work of this section perfect in all respects.

1.07 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All metals shall be free from defects impairing strength or durability, and of best commercial quality for purposes specified. Metals shall be made with structural properties to withstand safely the strains and stresses to which they will normally be subjected.
- B. For fabrication of the work of this Section which will be exposed to view, use only those materials which are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness.
- C. Standards: All materials shall comply with the latest version of the standard documents indicated:
1. Steel plates, shapes, and bars: ASTM A36.
 2. Steel plates to be bent or cold formed: ASTM A283, Grade C.
 3. Steel tubing, hot-formed, welded, or seamless: ASTM A501.
 4. Steel bars and bar-size shapes: ASTM A306 Grade 65, or ASTM A36.
 5. Cold-finished steel bars: ASTM A108, grade as selected by the fabricator.
 6. Cold-rolled carbon steel sheets: ASTM A336.
 7. Galvanized carbon steel sheets: ASTM A526, with ASTM A525, G90, zinc coating.
 8. Stainless steel sheets: Type 302/304 of American Iron and Steel Institute, 24 gauge, with No. 4 finish.
 9. Gray iron castings: ASTM A48, Class 30.
 10. Malleable iron castings: ASTM A47, grade as selected by the fabricator.
 11. Steel pipe: ASTM A53, type as selected, Grade A, black finish unless galvanizing is required, standard weight (Schedule 40) unless otherwise indicated.
 12. Concrete inserts: Threaded or wedge type, galvanized ferrous

castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153.

13. Non-shrink non-ferrous grout: CE CRD C588.
14. Aluminum extrusions shall be free of roll marks, scratches, rolled-in streaks and any other defect which may affect the uniform appearance of finished surfaces.
15. Aluminum extrusions must be at least 0.8" thick and sheet or plate, at least No. 16 gauge.
16. Aluminum pipe: 6063-T6 alloy.
17. Schedule of Aluminum Finishes:
 - a. Exposed exterior extrusions (except saddles, louvers, railings, and windows): 215-R1.
 - b. Exposed exterior sheet and plate: 215-R1.
 - c. Exposed interior extrusions: 204-R1.
 - d. Exposed interior sheet and plate: 204-R1.
 - e. Extrusion, sheet plate not exposed: Mill.
 - f. Casting: F.

2.02 WORKMANSHIP

A. General workmanship requirements:

1. Use materials of size and thickness shown, or if not shown, of required size and thickness to produce sufficient strength and durability in the finished product.
2. Work to dimensions shown or accepted on the Shop Drawings, using proven details of fabrication and support.
3. Use type of materials shown or specified for the various components of the work.
4. Form exposed work true to line and level, with accurate angles and surfaces and with straight, sharp edges.
5. Ease the exposed edges to a radius of approximately 0.8-mm (1/32") unless otherwise shown.
6. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
7. Weld corners and seams continuously, complying with AWS

recommendations. At exposed connections, grind exposed welds smooth and flush; match and blend with adjoining surfaces.

8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, use Phillips flat-head (countersunk) screws or bolts.
9. Provide for anchorage of the type shown. Coordinate with supporting structure. Fabricate and space the anchoring devices to provide adequate support for intended use.
10. Cut, reinforce, drill, and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

2.03 FABRICATIONS

A. Rough hardware:

1. Provide bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete and other structures.
2. Manufacture or fabricate items of sizes, shapes, and dimensions required.
3. Provide malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Loose bearing and leveling plates:

1. Provide loose bearing and leveling plates for steel items bearing on concrete construction, made flat, free from warps or twists, and of required thickness and bearing area.
2. Drill plates for anchor bolts and for grouting as required.
3. Galvanize after fabrication.

C. Miscellaneous framing and supports:

1. Provide miscellaneous steel framing and supports which are not part of structural steel framework, as required to complete work.
3. Fabricate miscellaneous units to sizes, shapes, and profiles shown; or, if not shown, of required dimensions to receive adjacent other work to be retained by framing.
4. Fabricate the miscellaneous units from structural steel shapes, plates, and steel bars of welded construction with mitered joints for field connection, unless otherwise shown.

5. Cut, drill, and tap units to receive hardware.
6. Equip units with integrally welded anchors for casting into concrete or building into masonry, and furnish inserts if units must be installed after concrete is placed.
7. Except as otherwise shown on Construction Drawings, space anchors at 24" on centers, and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.
8. Galvanize miscellaneous frames and supports where indicated.

D. Loose Lintels:

1. Provide loose lintels for all trades, over all openings where lintels are not shown on structural drawings or where door bucks over 3'-0" wide are not reinforced. Provide loose lintels for all door bucks, greater than 5'-0" carrying masonry above. For each 4" thickness of masonry, provide one 3 1/2" x 3 1/2" x 5/16" angle at spans 3'-0" or less; 6" x 3 1/2" x 3/8" angle at spans 3'-0" to 6'-4". For 6" thick walls, provide WT 7 x 11 for spans 3'-0" to 6'-4". For spans 6'-4" to 8'-0" at 6" walls, provide WT 7 x 13. Provide lintels at heads of all aluminum bucks where not indicated on structural drawings.
2. All exterior lintels and miscellaneous framing to be galvanized.

E. Steel framed stairs:

1. General:

- a. Use welding for joining pieces together, unless otherwise shown or specified. Fabricate units so that bolts and other fastenings do not appear on finish surfaces. Make joints true and tight, and make connections between parts lightproof tight. Provide continuous welds, ground smooth where exposed.
- b. Construct stair units to conform to sizes and arrangements shown. Provide all components for the support of stairs and platforms.

2. Stair framing:

- a. Fabricate stringers from structural steel channels, or plates, or a combination thereof as shown. Provide closures for ends of stringers.
 - b. Construct platforms of structural steel channel headers and miscellaneous framing members in the arrangement shown. Bolt or weld stringers to stringers.
3. Metal pan units: Form from structural steel sheet of the gauge shown on the drawings, and to the configuration shown on the drawings. Provide platforms of the same metal and gauge as

indicated for pans, unless otherwise indicated.

F. Saddles:

1. Saddles shall be cast abrasive aluminum fitted to full width of frame opening.
2. Set level by shimming in full bed of mastic and fasten with FHCS screws.

2.04 FASTENERS

A. General: Provide zinc-coated fasteners for exterior use and where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Standards: All fasteners shall comply with:

1. Bolts and nuts: Regular hexagon-head type, ASTM A307, Grade A.
2. Lag bolts: Square-head type, Fed. Spec. FF-B-561.
3. Machine screws: Cadmium plated steel, Fed. Spec. FF-S-92.
4. Wood screws: Flat-head carbon steel, Fed. Spec. FF-S-111.
5. Plain washers: Round, carbon steel, Fed. Spec. FF-W-92.
6. Masonry anchorage devices: Expansion shields, Fed. Spec. FF-S-325.
7. Toggle bolts: Tumble-wing type, Fed. Spec. FF-B-588, type, class, and style required.
8. Lock washers: Helical spring type carbon steel, Fed. Spec. FF-W-84.

2.05 PAINT/FINISHING

A. Shop priming:

1. Shop prime all ferrous miscellaneous metal work, except surfaces and edges to be field welded and galvanized surfaces, unless otherwise specified.
 - a. Remove oil, grease, and similar contaminants in accordance with SSPC-SP-1.
 - b. Clean off heavy rust and loose mill scale in accordance with SSPC-SP-2 or SSPC-SP-3.
 - c. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's recommendations, and at a rate to provide the recommended dry film thickness.

2. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.
3. Primer for ferrous metals: 10-1009 Gray Metal Primer by Tnemec Co., Inc.
4. Primer for Loose and Hung Steel Lintels: 50-330 Poly-Ura-Prime by Tnemec Co., Inc.
 - a. Lintel angles for exterior veneer, either loose or hung, shall be hot dip galvanized. Final painting shall be after installation, but prior to installation of items such as windows or louvers that would conceal the lintel or portion thereof.
5. Non-visible ferrous metals, such as structural steel, bearing plates or anchorage, which will be exposed to building cavities or set below grade shall be painted with Benjamin more M47/M48 Coal Tar Epoxy.
6. All listed primers shall be compatible with finish coats of paint. Coordinate selection of metal primer with actual finish paint provided under Section 09900 of these Specifications.

2.06 GALVANIZING

- A. Provide hot-dip zinc coating for those items shown or specified to be galvanized, as follows:
 1. ASTM A153 for galvanizing iron and steel hardware.
 2. ASTM A123 for galvanizing rolled, pressed, and forged steel shapes, plates, bar, and strip 3 mm (1/8") thick and heavier.
 3. ASTM A386 for galvanizing assembled steel products.
- B. Galvanizing repair paint: Use a high zinc dust content paint for regalvanizing welds in galvanized steel, or to repair damage incurred during handling and installation, complying with MIL SPEC MIL-P-21035.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

3.03 INSTALLATION

A. Setting loose plates:

1. Clean concrete bearing surfaces free from bond-reducing materials, and roughen to improve bond to surfaces. Clean the bottom surface of bearing plates.
2. Set loose leveling and bearing plates on wedges, or other adjustable devices.
3. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims; but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

B. Setting lintels:

1. Bear 8" minimum at each side of opening wherever possible. Furnish clip angles or other approved connection securely anchored to supporting construction and bolt to lintels wherever 8" bearing is not possible.

C. Installing stairs:

1. Install in accordance with approved shop drawings, providing all anchorage, welding, or bearing as specified on said shop drawings.

- D. Fastening to in-place construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

E. Cutting, fitting, and placement:

1. Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications.
2. Set work accurately in location, alignment, and elevation, and make plumb, level, true, and free from rack, measured from

established lines and levels.

3. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.
 4. Fit exposed connections accurately together to form tight hairline joints.
 5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
 6. Grind exposed joints smooth, and touch up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- F. Field welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of weld made, and methods in correcting welding work.
- G. Touch up painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.

3.04 CLEANING, ACCEPTANCE, AND PROTECTION

- A. All work shall be properly protected from defacement or damage. Defective work shall be satisfactorily repaired or removed and replaced at no additional cost to the Owner.
- B. Upon completion, inspection, and approval by the Architect, the ornamental work of this section shall be cleaned with a mild soap and water or a petroleum distillate and all temporary protective coatings removed, except Methacrylate Lacquer.
- C. All operative items shall be adjusted to work properly and the work left whole, clean, and in perfect condition.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.

1.02 SUMMARY

- A. Types of work in this section include rough carpentry for:
 - 1. Framing with dimensional lumber as shown on the drawings and as specified herein.
 - 2. Plywood, OSB, particleboard panels and/or other sheathing as shown on the drawings and as specified herein.
 - 3. Wood blocking, nailers and/or sleepers.

1.03 RELATED SECTIONS

- A. 06170 - Prefabricated Structural Wood.
- B. 06164 - Gypsum Sheathing.
- C. 06200 - Finish Carpentry.
- D. 07200 - Building Insulation.
- E. 07231 - Air Vapor Barrier System.
- F. 07241 - Direct Applied Exterior Finish Systems.
- G. Various Division 7 Roofing Specifications.
- H. Various Division 9 Finishes Specifications.
- F. If designated as a LEED project, then also:*
 - 1. Division 1 Section "LEED Requirements" for recycled content and regional materials requirements, submittals and additional LEED requirements.*
 - 2. Division 1 Section "Construction Waste Management" for recycling construction waste.*

1.04 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated.

- B. Exposed Framing: Framing not concealed by other construction.
- C. Dimensional Lumber: Lumber of 2 inches nominal or greater, but less than 5 inches nominal in least dimension.

1.05 QUALITY ASSURANCE

- A. All materials shall be provided and all work shall be performed in accordance with the NYS Uniform Building Code requirements (current version).
- B. Lumber shall be certified by the following authorities/grading agencies:
 - 1. NELMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.
 - 7. FSC: Forest Stewardship Council.

1.06 SUBMISSIONS

- A. All submissions shall be made in accordance with Section 01300 - Submissions and as modified below.
- B. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit a listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in forms of a signed copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.
- C. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.
 - 1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, note amount of preservative retained, and conformance with applicable standards.
 - a. For water-borne treatment include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
 - b. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

- D. *LEED Submittals; for projects requiring LEED certification, submit the following additional information:*
1. *Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements".*
 2. *Credit EQ 4.1: Manufacturers' product data for interior field-applied construction adhesive, including printed statement of VOC content in accordance with Section 01352 "LEED Requirements".*
 3. *Credit EQ 4.4: Composite wood manufacturer's product data for each composite wood product used indicating that product's bonding agent contains no urea formaldehyde in accordance with Section 01352 "LEED Requirements".*
 4. *Forest Certification for the following wood products; materials produced from wood obtained from forests certified by a Forest Stewardship Council (FSC)-accredited certification body to comply with FSC 1.2, "Principles and Criteria":*
 1. *Dimensional lumber framing.*
 2. *Plywood.*

1.07 DELIVERY, STORAGE AND PRODUCT HANDLING

- A. *Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels flat with spacers between each bundle to provide for air circulation around stacks and under coverings.*

PART 2 - MATERIALS

2.01 LUMBER, GENERAL

- A. *Lumber Standards: Manufacture lumber to comply with "Voluntary Lumber Standard" DOC PS20-10, or most current edition, and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.*
1. *Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill..*
 2. *Where nominal sizes are indicated, provide actual sizes required by DOC PS20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.*
 3. *Provide dressed lumber, S4S, unless otherwise indicated.*
 4. *Plywood Standards: Comply with the latest edition of U.S.*

Product Standard PSI and APA performance standards.

5. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:
 1. SPIB: Southern Pine Inspection Bureau.
 2. WWPAA: Western Wood Products Association.
- C. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing and mill.

2.02 FRAMING LUMBER

- A. For items of dimensional lumber size, provide Construction or No. 2 grade lumber with 15 percent maximum moisture content of any species, unless otherwise noted on the Construction Drawings.
 1. Hem-fir (north); NLGA.
 2. Mixed southern pine; SPIB.
 3. Spruce-pine-fir; NLGA.
 4. Hem-fir; WCLIB, or WWPAA.
 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPAA.
 6. Species group below includes hem-fir and spruce-pine-fir (south).
 7. Western woods; WCLIB or WWPAA.
 8. Northern species; NLGA.

2.03 MISCELLANEOUS LUMBER

- A. Provide wood for support or attachment of other work including cant strips, nailers, blocking, furring, grounds, stripping, rooftop equipment bases and support curbs, and similar members. Provide lumber sizes indicated, worked into shapes shown.
 1. Grade: Standard grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPAA rules or No. 3 boards per SPIB rules.

2.04 PLYWOOD PANELS AND ROOF SHEATHING

- A. Plywood must contain no urea-formaldehyde resins.
- B. Telephone and Electrical Equipment Backing Panels: DOC PS1, Exposure

1, C-D Plugged, in thicknesses as indicated, not less than ½ inch nominal thickness.

C. Plywood Roof Sheathing: Exposure 1, Structural 1 sheathing.

1. Span Rating: Not less than 48/24.

2. Nominal Thickness: Not less than 23/32 inch.

2.05 MISCELLANEOUS MATERIALS

A. Fasteners and Anchorages: Provide size, type, material, and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

1. Where rough carpentry work is exposed to weather, in ground contact, pressure-preservative treated, or in areas of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating, complying with ASTM A153.

2. Nails, brads and staples shall comply with ASTM F 1667.

3. Power-Driven fasteners shall comply with NES NER-272.

4. Wood Screws shall comply with ASME B18.6.1.

5. Lag Bolts shall comply with ASME B18.2.1.

6. Bolts: Steel bolts shall comply with ASTM A307, Grade A; with ASTM A563 hex nuts and, where so indicated, flat washers.

7. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

a. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

b. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

8. Metal Framing Anchors (where applicable):

a. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or engineered-approved equals by one of the following:

a. Simpson Strong-Tie Co., Inc.

- b. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
 - c. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet, complying with ASTM A 653, G60 (Z180) coating designation.
 - d. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- D. Building Paper: Asphalt saturated felt, non-perforated conforming to ASTM D226.
- E. In the absence of requirements of section 07231, provide a self-adhering vapor-permeable air barrier membrane; Blueskin Breather manufactured by Henry; a self-adhering membrane consisting of a microporous film laminate, backed with a specially applied adhesive, which allows water vapor to permeate through while acting as a barrier to air and rain water. Membrane shall have the following physical properties:
- 1. Air leakage: <0.002 CFM/ft² @ 1.6 lbs/ft² to ASTM E283-91.
 - 2. Water vapor permeance: 37 perms to ASTM E 96.
 - 3. Membrane Thickness: 17 mils.
 - 4. Low temperature flexibility -40 degrees F: Pass to ASTM D3111.
 - 5. Hydrostatic Water Resistance: 18 psi ASTM D751 Procedure
- E. Sill Sealer Gaskets: Glass fiber resilient insulation fabricated in strip form for use as a sill sealer; 1" nominal thickness compressible to 1/32"; selected from manufacturer's standard widths to suit width of sill members indicated; in rolls of 50' or 100' in length.
- F. Water-Repellent Preservative: (for exposed ends of posts and beams, not for treating cuts in preservative-treated lumber): NWWDA-tested and accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.
- G. Construction Adhesive: Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.06 FIRE RETARDANT-TREATED LUMBER

- A. General: Where fire-retardant-treated lumber and plywood are indicated, use materials impregnated with fire-retardant chemicals by a pressure process or other means acceptable to authorities having jurisdiction to produce products with the following fire-test-response characteristics:
 - 1. Flame-spread index of not greater than 25 when tested according to ASTM E 84.
- B. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
- C. Exterior-Type Fire-Retardant Treatment: Organic-resin-based formulation that shows no increase in flame spread of treated material after being weathered according to ASTM D 2898, Method A.
- D. Kiln-dry material after treatment to levels required for untreated material. Do not use material that does not comply with requirements for untreated material or is warped or discolored.
- E. Acceptable pressure-impregnated products include Hoover's Pyro-Guard for interior applications and Exterior Fire-X for exterior applications.

2.07 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: Where lumber or plywood is indicated as "Trt-Wd" or "Treated," or is specified herein to be treated, comply with applicable requirements of AWPB Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPB C31 with inorganic boron (SBX). Mark each treated item with the AWPB Quality Mark Requirements, and with the quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2, acceptable to authorities having jurisdiction and containing no arsenic or chromium. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Do not use material that is warped or does not comply with requirements for untreated material. Treat indicated items and the following:
 - a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

- c. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
- d. Wood framing members less than 18" above grade, in crawl spaces or unexcavated areas.
- e. Wood floor plates that are installed over concrete slabs-on-grade.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Discard units with material defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- B. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other work.
- D. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
 - 1. Unless otherwise indicated on the Construction Drawings, framing shall be at 16" centers.
- E. Metal Anchors for Engineered Wood Products (where applicable): Install metal anchors to comply with manufacturer's written instructions.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber.
- G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- H. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Comply with Table 2304.10.1 - "Fastening Schedule" in ICC's International Building Code. Provide all blocking and framing as indicated and as required in order to support facing materials, fixtures, specialty items, and trim.

- I. Use common wire nails, except as otherwise indicated; use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- J. Do not splice structural members between supports.

3.02 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Provide wherever shown and where required for attachment to other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.03 WALL AND PARTITION FRAMING

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness, whose widths equal that of studs. Fasten plates to supporting construction.
 - 1. Space wood studs at 16 inches o.c., unless otherwise indicated.
 - 2. Provide continuous horizontal blocking at mid-height of partitions more than 96 inches high, using members of 2-inch nominal thickness, and of same width as wall or partitions.
- B. Construct corners and intersections with three (3) or more studs.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb (jack) studs.
 - 1. For load-bearing walls, provide double-jamb (jack) studs for openings 60 inches and less in width, and triple-jamb (jack) studs for wider openings. Provide headers of depth indicated on the drawings.
- D. Provide diagonal bracing in walls, at locations indicated, full-story height, unless otherwise indicated.

3.04 FLOOR JOIST FRAMING

- A. Space joists at 16 inches o.c., unless otherwise indicated.
 - 1. Set each joist with crown up.

2. Provide continuous horizontal blocking at mid-span of joists, using members of same nominal size of joists.
- B. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of joists.
1. Provide double-joists, nailed together, directly beneath non-bearing partition walls when joist run parallel to said walls.

3.05 RAFTER FRAMING

- A. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut ridge, place directly opposite each other and nail to ridge member, or use metal ridge hangers.
1. Space wood rafters at 16 inches o.c., unless otherwise indicated.
 2. Set each rafter with crown up.
- B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.06 PLYWOOD SHEATHING

- A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Install with the long dimension of the panel across supports, except where noted, and with panel continuous over two or more spans. Suitable edge support shall be provided where indicated on drawings (or in recommendations of the American Plywood Association) by use of panel clips, tongue-and-groove panels, or lumber blocking between joists. Panel end joints shall occur over framing. Allow 1/8-inch spacing at panel ends and 1/4-inch at panel edges, unless otherwise recommended by the panel manufacturer.
- C. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
- D. Nail 6 inches o.c. along panel edges and 12 inches o.c. at intermediate supports, except that when supports are spaced 48 inches o.c. or more, space nails 6 inches o.c. at all supports. Use 6d common nails for panels 1/2-inch and less and 8d for greater thicknesses, except that when panels are 1-1/8 inch, use 8d ringshank or 10d common.

3.07 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions, Division 1 Specification sections, apply to work of this section.

1.02 SUMMARY

- A. Types of work in this section include finish carpentry for:
 - 1. Exterior standing and running trim.
 - 2. Interior standing and running trim.
 - 3. Interior plywood.
 - 4. Window stools & aprons.
 - 5. Closet shelving.
- B. Casework, cabinetry, countertops, and wainscot paneling systems are specified in other Division 6, Division 11, and Division 12 sections.

1.03 RELATED SECTIONS

- A. 06100 - Rough Carpentry.
- B. Various Division 9 Finishes Specifications.
- C. *If designated as a LEED project, then also:*
 - 1. *Division 1 Section "LEED Requirements" for recycled content and regional materials requirements, submittals and additional LEED requirements.*
 - 2. *Division 1 Section "Construction Waste Management" for recycling construction waste.*

1.04 QUALITY ASSURANCE

- A. Lumber: Comply with Voluntary Product Standard PS-20. Lumber shall bear grade and trademark of the association under whose rule it is produced.
 - 1. Southern Forest Products Association (SFPA).
 - 2. West Coast Lumber Inspection Bureau (WCLIB).

3. American Plywood Association (APA).
 4. Western Wood Products Association (WWPA).
 5. American Wood Preservers Bureau (AWPB).
 6. National Woodwork Manufacturer's Association (NWMA).
 7. National Hardwood Lumber Association (NHLA).
 8. Architectural Woodwork Institute (AWI).
 9. Wood Moulding and Millwork Producers (WM).
 10. Forest Stewardship Council (FSC).
- B. Plywood Grading Rules:
1. U.S. Product Standard PS 1-83 for Construction and Industrial Plywood.
 2. American Plywood Association (A.P.A.).
- C. Perform finish carpentry in accordance with AWI Quality Standards, "Custom" grade, unless otherwise noted.

1.05 SUBMITTALS

- A. All submissions shall be made in accordance with Section 01300 - Submissions and as modified below.
- B. Submit shop drawings and product data for architectural woodwork. Indicate materials, component profiles, jointing details, finishes, and accessories.
1. If requested, provide 6" long samples of trim pieces.
- C. *LEED Submittals; for projects requiring LEED certification submit the following:*
1. *Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "LEED Requirements".*
 2. *Credit EQ 4.1: Manufacturers' product data for interior field-applied construction adhesive, including printed statement of VOC content in accordance with Section 01352 "LEED Requirements".*
 3. *Credit EQ 4.4: Composite wood manufacturer's product data for each composite wood product used indicating that product's bonding agent contains no urea formaldehyde in accordance with Section 01352 "LEED Requirements".*

4. *Forest Certification for the following wood products; materials produced from wood obtained from forests certified by a Forest Stewardship Council (FSC)-accredited certification body to comply with FSC 1.2, "Principles and Criteria":*

a. Finish lumber and moldings.

b. Finish plywood, veneers.

1.06 DELIVERY, STORAGE AND PRODUCT HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
- C. Do not deliver finish carpentry materials, until painting, wet work, grinding, and similar operations which could damage, soil, or deteriorate woodwork have been completed in installation areas.
- D. Deliver interior finish carpentry only when environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - MATERIALS

2.01 SEASONING

- A. Moisture Content: Except grades and species having a definite moisture content limitation under established grading rules, lumber shall be kiln-dried to a maximum moisture content of twelve percent (12%).

2.02 EXTERIOR STANDING AND RUNNING TRIM

- A. Trim shall be of sizes, configurations, and profiles as indicated on the drawings for the following applications.
 - 1. Finished lumber.
 - 2. Door and window casings.

3. Fascia, rake, and associated trim.
 4. Other applications as may be detailed on the drawings.
- B. Exterior applications shall be clear all-heart redwood, clear heart western red cedar, southern yellow pine, or black locust, unless otherwise noted on the drawings as a different species or resin-based, hardboard, or composite material.
1. Provide WM grade P for opaque/painted finish.
 2. Provide WM grade N for natural/stained finish.

2.03 INTERIOR STANDING AND RUNNING TRIM

- A. Trim shall be of sizes, configurations, and profiles as indicated on the drawings for the following applications.
1. Finished lumber.
 2. Door and window casings.
 3. Wall base molding.
 4. Chair rails.
 5. Crown moldings.
 6. Picture moldings.
 7. Other applications as may be detailed on the drawings.
- B. Interior softwood applications shall be select eastern white pine or sapwood birch; hardwood applications shall be white oak, red oak, or hard maple, unless otherwise noted on the drawings as a different species or resin-based, hardboard, or composite material.
1. Provide WM grade P for opaque/painted finish.
 2. Provide WM grade N for natural/stained finish.

2.04 INTERIOR PLYWOOD

- A. Exposed finished plywood applications shall utilize furniture-grade plywood of a face species coordinating with specified trim or as indicated on the drawings.
1. Provide Type II interior sound grade for opaque/painted finish.
 2. Provide Type II interior grade A for natural/stained finish.
- B. Thicknesses shall be as indicated on the drawings.

1. Shelving plywood shall be nominal 3/4" minimum.
- C. Comply with PS 1-83. Interior plywood in proximity to water (toilet rooms, sinks, etc.): manufactured with exterior glue.
 1. Plywood must contain no urea-formaldehyde resins.

2.05 WINDOW STOOLS & APRONS

- A. Window stools shall be constructed of hardwood lumber species as indicated on the drawings. If no species is indicated, bids shall be based upon red oak.
 1. Utilize nominal 1" board stock for widths of 7-1/4" or less. For wider applications, utilize nominal 5/4" board stock.
 2. Exposed edges shall be bullnosed.
- B. Aprons shall be of similar species as window stools and shall be wide enough to cover rough wood blocking or GWB edge transition beneath.

2.06 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide nails, screws, and other anchoring devices of the proper types, size, material, and finish for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications and reference AWI standard.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Condition materials to average prevailing humidity conditions in installation areas prior to installing.
- B. Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Section 09900 - Painting & Staining.

3.02 INSTALLATION

- A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes, or patterns.
- B. Product joints which are true, tight, and well nailed with all members assembled in accordance with the Drawings. Field sand all finish trim material smooth, except Cedar, to remove saw marks, raised grain, etc. Cut all corners square and ease slightly.

- C. Jointing: Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints. Install trim in pieces as long as possible, jointing only where solid support is obtained.
 - 1. Door and window casings shall be single lengths without splicing.
- D. Fastening:
 - 1. Install items straight, true, level, plumb, and firmly anchored in place.
 - 2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
 - 3. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.
 - 4. Nail exterior trim with galvanized nails, making joints to exclude water.
 - 5. On exposed work, set nails for putty.
- E. Prime paint surfaces in contact with cementitious materials or separate with felt.

3.03 INSTALLATION OF OTHER ITEMS

- A. Set items at locations shown, in perfect alignment and elevation, plumb, level, straight, true and free from rack, scribed to adjoining work.
- B. Appearance: finished surface shall be free of tool marks.

3.04 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION

- A. Keep premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends, and debris.
- B. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- C. Clean finish carpentry work on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.
- D. Protection: Installer of finish carpentry work shall advise Contractor of final protection and maintain condition necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION

06200-7

Rev. 05-23-14 - LEED

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07190 - UNDER SLAB VAPOR BARRIER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Work specified in this section covers furnishing, delivery, and installation of a vapor barrier under all new interior slabs on grade (horizontal application).
- B. Products supplied under this section:
 - 1. Vapor Barrier, seam tape, mastic, pipe boots, detail strip for installation under concrete slabs.
- C. Related Sections:
 - 1. Section 03300 - Cast-in-Place Concrete.
 - 2. Section 07200 - Building Insulation

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM E 1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
 - 2. ASTM E 1993/E1993M-98 (2013) - Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
 - 3. ASTM E 154-08a 2a3e1 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
 - 4. ASTM E 96-13 Standard Test Methods for Water Vapor Transmission of Materials.
 - 5. ASTM E 1643-11 (2017) Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- B. American Concrete Institute (ACI)
 - 1. ACI 302.2R-06 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

1.03 SUBMITTALS

- A. Quality Control/Assurance
 - 1. All submissions shall conform to General Conditions Section G31.
 - 2. Full set of test results per paragraph 8.3 of ASTM E 1745.

3. Manufacturer's samples, literature
4. Manufacturer's installation instructions for placement, seaming and pipe boot installation.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Stack membrane on smooth ground or wood platform to eliminate warping.
- D. Protect materials during handling and application to prevent damage or contamination.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply on frozen ground.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Vapor Barrier: Under typical interior slabs where finished flooring does not involve wood, provide non-woven, polyester, reinforced, polyethylene coated sheet of 15 mil thickness.
 1. Vapor Barrier membrane must have the following properties:
 - a. Permeance as tested after mandatory conditioning (ASTM E 1745 paragraphs 7.1.2-5): less than 0.01 perms (grain/ft²/hr/in-Hg).
 - b. Other performance criteria:
 1. Strength: Class A (ASTM E 1745).
 2. Minimum thickness of the plastic retarder material: 15 mils.
 - c. Basis of Design: Stego Wrap 15-mil Vapor Barrier by Stego Industries LLC.
 - d. Or Architect approved equal.
 - B. Vapor Barrier under interior slabs where finished flooring involves wood assemblies such as gymnasiums and stages provide Bituminous Vaporproofing/Waterproofing Membrane
 1. Vapor Barrier must be seven-ply, weather-coated, permanently

bonded, semi-flexible bituminous core board composed of a 3-ply plasmatic matrix sealed between liners of asphalt-impregnated felt and a glass mat liner. Vapor Barrier shall consist of an asphalt weather coat and covered with a polyethylene anti-stick sheet. Vapor Barrier shall meet or exceed all requirements of ASTM E 1993-98 and shall have the following characteristics:

- a. Minimum Permeance ASTM F1249, calibrated to ASTM E96, Water Method: 0.0011 Perms.
- b. Tensile Strength ASTM E154, Section 9: 156 LBS. force.
- c. Puncture Resistance ASTM E154: 149 LBS. force/inch.
- d. Premoulded Membrane® Vapor Seal with Plasmatic Core by W.R Meadows. W.R. Meadows, Inc., PO Box 338, Hampshire Illinois 60140-0338. (800) 348-5976. (847) 683-4500. Fax (847) 683-4544. website www.wremeadows.com.

2.02 ACCESSORIES FOR TYPICAL POLYESTER-REINFORCED, POLYETHYLENE COATED SHEET

A. Seam Tape

- 1. Tape must have the following qualities:
 - a. Water Vapor Transmission Rate ASTM E 96; 0.3 perms or lower.
- 2. Seam Tape
 - a. Stego Tape by Stego Industries, LLC or equal.

B. Vapor Proofing Mastic

- 1. Mastic must have the following qualities:
 - a. Water Vapor Transmission Rate ASTM E 96; 0.3 perms or lower.
- 2. Mastic
 - a. Stego Mastic by Stego Industries, LLC or equal.

C. Pipe Boots

- 1. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

2.03 ACCESSORIES FOR BITUMINOUS VAPORPROOFING/WATERPROOFING MEMBRANE

- A. Bonding Asphalt: Sealtight Catalytic Bonding Asphalt.
- B. Adhesive: Sealtight Pointing Mastic.
- C. Joint Tape: Sealtight PMPC Tape.
- D. Pointing Mastic: Sealtight Pointing Mastic.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Ensure that subsoil is approved by architect or geotechnical firm.
 - 1. Level and tamp or roll aggregate, sand or tamped earth base.
- B. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- C. Prepare surfaces in accordance with manufacturers instructions.

3.02 INSTALLATION

- A. Install Plastic Film Vapor Barrier/Retarder:
 - 1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98 (2005).
 - a. Unroll Vapor Barrier/Retarder with the longest dimension parallel with the direction of the pour.
 - b. Lap Vapor Barrier/Retarder over footings or seal to foundation walls.
 - c. Overlap joints 6 inches and seal with manufacturer's tape.
 - d. Seal all penetrations (including pipes) per manufacturer's instructions.
 - e. No penetration of the Vapor Barrier/Retarder is allowed except for reinforcing steel and permanent utilities.
 - f. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 inches and taping all four sides with tape.
- B. Install Bituminous Vaporproofing/Waterproofing Membrane
 - 1. Apply membrane in accordance with manufacturer's instructions to provide a permanent, monolithic vapor seal without voids or open seams.
 - 2. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.
 - 3. Place membrane in position by Dutch lap method with laps sealed with bonding asphalt.
 - 4. Point exposed edges with pointing mastic to prevent water from traveling under membrane.
 - 5. Place membrane collar around protrusions through concrete slab, including sewer pipes, water pipes and

utility inlets to create a positive seal between protrusions and membrane. Seal in place with joint tape and point around protrusions with pointing mastic.

6. Adhere membrane to vertical surfaces with adhesive.

3.03 PROTECTION

- A. Protect all vapor barriers from injury before and during placement of reinforcing and concrete. Check for and repair any puncture before start of concrete placement.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07200 - BUILDING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Furnish labor, materials, tools, and equipment necessary or required to perform and complete the installation of building insulation as indicated on the drawings and specified herein. This Section includes the following: Rigid board insulation at exterior masonry cavity wall construction and under metal wall panels; Rigid board insulation at perimeter foundation walls; Rigid board insulation at underside of floor slabs; Fibrous blanket insulation for thermal purpose, where indicated; Miscellaneous batt insulation to maintain continuity of building thermal barrier; Protective cover over insulation board prior to placement of backfill or concrete cover.
- B. Related Documents: Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- C. Related Sections include the following:
 - 1. Division 4 Section "Unit Masonry" for concrete unit masonry.
 - 2. Division 6 Section "Carpentry Work" for wood framing and supportive construction.
 - 3. Division 7 Section "Firestopping" for fire-stop and smoke-stop materials at voids around penetrations through fire-rated and smoke barrier wall and roof construction assemblies.
 - 4. Division 8 Section "Aluminum Windows" for miscellaneous batt insulation required at periphery of windows.
 - 5. Division 8 Section "Standard Steel Doors and Frames" for miscellaneous batt insulation required at periphery of storefront framing system.
 - 6. Division 9 Section "Gypsum Board Assemblies" for sound attenuation insulation, metal stud and drywall partition construction.
 - 7. Division 9 Section "Suspended Acoustical Ceilings" for ceilings to receive thermal lay-in insulation.

1.02 QUALITY ASSURANCE

- A. Standards: Comply with standards specified in this section and as listed in Section 01085.
- B. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):

- a. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- b. ASTM C518 - Steady-State Thermal Transmission Properties by Means of The Heat Flow Meter.
- c. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- d. ASTM D1621 - Compressive Properties of Rigid Cellular Plastics.
- e. ASTM E84 - Surface Burning Characteristics of building Materials.
- f. ASTM E119 - Fire Tests of Building Construction and Materials.
- g. ASTM E2178 - 11 Standard Test Method for Air Permeance of Building Materials
- h. ASTM E2357 - 11 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

2. Federal Specifications (FS):

- a. FS HH-I-521E - Insulation Blankets, Thermal Fiber, for Ambient Temperatures.

1.03 SUBMISSIONS

- A. General: Comply with requirements of Section 01300: Submissions.
- B. Product Data: Submit manufacturer's specifications and installation instructions and recommended procedures for application of adhesives for each type of insulation.
- C. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values (aged values for plastic insulations), densities, compression strengths, fire performance, perm ratings, water absorption ratings, and similar properties.
- D. Samples for Verification:
 - a. Submit, to the job site, 6" x 6" samples of each type and thickness of insulation.
 - b. Submit appropriate sample of loose fill insulation.
 - c. Submit manufacturer's verification that rigid insulation contains at least 20% combined post-consumer and post -industrial recycled content.
 - d. Submit manufacturer's verification that batt insulation contains at least 30% combined post-consumer and post -industrial recycled content.

- e. Submit manufacturer's verification that cellulose insulation contains at least 85% combined post-consumer and post -industrial recycled content.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered in their original, unopened packages or containers; labels shall be intact, identifying contents, manufacturer, brand name, thermal values and applicable standards. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.
- B. Store all materials in a single location protected from weather, moisture, and open flame or sparks.
- C. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.
- D. Comply with manufacturer's written recommendations for handling, storage, and protection during installation.
- E. Warning: Rigid insulation is combustible and may constitute a fire hazard; adequate protection shall be provided in accordance with National Fire Protection Association (NFPA) standards or the authority having jurisdiction.
- F. Cover and protect insulation with light colored or white opaque covering while in storage; sunlight causes discoloration and deterioration that impairs adhesive bonding.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

- A. General: Design is based on insulating materials as specified on drawings. The terminology used may include reference to specific manufacturers' proprietary products. Such reference shall be construed only as establishing the quality of the materials and workmanship to be used under this section and shall not, in any way, be construed as limiting competition.
- B. Products used shall be those upon which design is based or shall be equal products approved in advance by the Architect.
- C. Materials:
 - 1. Exterior Wall Sheathing Insulation Basis-of-Design: has been specified around standard products as manufactured by Owens-Corning Foam Insulation Corporation, Toledo, OH: compliance with requirements, provide the named product or a comparable product by one of the following: Similar or equal to "Foamular", rigid closed cell foam panels conforming to ASTM C578. Provide 1/2" thickness at exterior wall locations, typical.

2. Rigid Perimeter and Under Floor Slab Insulation Basis-of-Design: has been specified around standard products as manufactured by The Dow Chemical Company, Construction Materials Group, Midland, MI; Telephone: 1-800-232-2436. Subject to compliance with requirements, provide the named product or a comparable products by one of the following:
 1. Amoco Foam Products Company, Atlanta, GA.
 2. UC Industries, Inc., Parsippany, NJ.
3. Fiberglass Blanket Insulation Basis-of-Design: has been specified around Fiberglas Building Insulation Blankets as manufactured by Owens-Corning Fiberglas Corporation, Toledo, OH. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 1. CertainTeed Corporation.
 2. Johns Manville Corporation.
4. Suspended ceiling insulation: Owens-Corning Fiberglass 'Sonobatts' unfaced and faced insulation or Architect approved equal - Refer to drawings for types, R-Values and thicknesses.
5. Safing insulation: *Thermafiber* safing insulation or Architect approved equal with VOC content in accordance with Section 01352 "*LEED Requirements*".
6. Smoke seal compound: *Thermafiber* or Architect approved equal with VOC content in accordance with Section 01352 "*LEED Requirements*".
7. Nailable Rigid roof insulation board: "*Nailboard*", 3" overall thickness (R-15.9) closed cell polyisocyanurate foam core insulation board with 5/8" thick OSB as manufactured by Johns Manville or Architect approved equal.
 - a. Standard board size to be 4' x 8' x 3" thick with an averaged R-Value of 15.9.
 - b. Rigid board shall be UL class A fire rated.
 - c. OSB must contain no urea-formaldehyde resins.
8. Rigid roof insulation board: "*Energ'y-3*", 1 1/2" (R-10) closed cell polyisocyanurate foam core insulation board as manufactured by *Johns Manville* or Architect approved equal.
 - a. Standard board size to be 4' x 8' x 1 1/2" thick with an averaged R-Value of 10.
 - b. Rigid board shall be UL class A fire rated.
 - c. All rigid board installation shall be in conformance with manufacturer's specifications.

- D. Flame Spread & Smoke Developed Rating: All insulation materials shall have a flame spread rating of less than 25 and smoke developed not to exceed 450, in accordance with ASTM E-84.

2.02 MATERIAL REQUIREMENTS

A. Cavity Wall Insulation: Dow "Styrofoam CAVITYMATE ULTRA INSULATION", rigid, extruded cellular polystyrene board conforming to air barrier test requirement ASTM E2178 for a maximum air permeance no greater than 0.004 cfm/ft² to be used in conjunction with "GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant" to create an air barrier system; the air barrier qualities of this system have been tested and meet the requirements of ASTM E2357 and meet all relevant code requirements for infiltration resistance.

1. Thermal Resistance: Aged R-values of 6.0 and 5.6 min. per inch °F-ft²-h/Btu²/inch at 40 °F and 75 °F respectively (ASTM C 518-98), and warranted by manufacturer to retain at least 90% of its original R-value for 15 years.
2. Thickness: As indicated on drawing details.
3. Compressive Strength: Comply with ASTM C 578-95, Type IV, density 1.6 lb/cu. ft. min. compressive resistance 25 psi (ASTM D 1621-94)
4. Water Absorption: Maximum 1% by volume, ASTM C 272-91 (96).
5. Edges: Square.
6. Maximum Flame Spread and Smoke Developed indexes: When tested in accordance with ASTM E84.
 - a. Flame Spread: 75.
 - b. Smoke Development: 450.
7. Surface Burning Characteristics: When tested in accordance with ASTM C 578-95.
 - a. Flame Spread: 0.
 - b. Smoke Development: 155.
8. Foam Blowing Agent: Shall provide at least a 90% reduction in ozone depletion potential as compared with CFC's and shall be certified by foam manufacturer.
9. NOTE: Molded "bead board" will not be acceptable.

B. Perimeter and Under Slab Insulation: Dow "Styrofoam Square Edge" with same performance characteristics as specified above for cavity wall insulation.

C. Adhesive: Dow "GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant"; capable of securely adhering to applicable surface(s) with

VOC content in accordance with Section 01352 "LEED Requirements".

D. Batt / Blanket Insulation:

1. General Thermal Use Insulation: Preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type, 3-1/2" (89mm) thick, with a thermal resistance (R-value) of R-11, unless thickness and R value are noted otherwise.
2. Wall Insulation: Types as called for on the drawings, preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type or ASTM C665, Type II, Class C, with Kraft-faced integral vapor barrier, as indicated on drawings, 6 1/4" (159mm) thick, and a thermal resistance (R-value) of R-19, unless thickness and R value noted otherwise.
3. Ceiling Insulation: Preformed glass fiber, ASTM C665, Type I, unfaced without integral vapor barrier, friction fit type, 6 1/4" (159mm) thick with a thermal resistance (R-value) of 19; 12" (305mm) thick, and a thermal resistance (R-value) of R-38, unless thickness and R value noted otherwise.
4. Fire-Hazard Classification: When tested in accordance with ASTM E84.
 - a. Concealed Installations:
 1. Flame Spread Rating: 25 maximum.
 2. Smoke Development Rating: 50 maximum.
 - b. Exposed installations:
 1. Flame Spread Rating: 75 maximum.
 2. Smoke Development Rating: 450 maximum.
5. Cellulose Insulation:
 - a. Cellulose Insulation by weight:
 1. Newsprint (Cellulose Fiber): Not less than 85 percent, with a minimum of 80 percent post-consumer recycled paper fiber.
 2. Boric Acid H_3BO_3 : Not more than 10%.
 3. Ammonium Sulfate $(NH_4)_2HPO_4$: Not more than 11%.
 4. Guar Gum or Wheat Starch: Not more than 2%.
 5. Mono Ammonium Phosphate $NH_4H_2PO_4$: Not more than 2%.
 6. Zinc Sulfate $ZnSO_4 \cdot H_2O$: Not more than 2%.
 - b. Physical and Chemical Properties:
 1. Bulk Density 9lb/ft³ compressed.
 2. Appearance: Grey, odorless fiber.
 3. Vapor Pressure Negligible @ 20 degrees C (68 degrees F).
 4. Solubility in Water: Not soluble
 5. Boiling/melting point: Not Applicable
 6. Flash Point Not Applicable
 7. pH: <8.2 (2.0 percent suspension @ 25 degrees C (77 degrees F))
 8. Viscosity: Not Applicable.
 9. Self-supporting and adheres to typical wood, metal gypsum

- board and concrete.
 - 10. To contain no asbestos, formaldehyde, mineral wool or fiberglass.
 - 11. Non-corrosive to metals.
 - 12. Fungal Resistant.
- E. Staples: Electroplated or galvanized steel wire, type and size as recommended for application.
- F. Wire-Up: Utilize 16 or 18 gauge line wire run diagonally or perpendicular to insulation every 18 to 24 inches.
- G. Impaling Pin: Utilize impaling pins welded or fastened with adhesive. Impale insulation on anchor and secure with washer.
- H. Miscellaneous Batt Insulation: Preformed glass fiber, ASTM C665, Type I, un-faced without integral vapor barrier membrane, field cut to appropriate size and thickness as required or indicated on Contract Drawings.
- I. Protective Board Covering: 1/8" thick biodegradable hardboard, 1/4" minimum thickness of wood fiberboard, or other protective covering as approved by the Architect.

2.03 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be as selected by the Contractor, subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 INSPECTION, SURFACE PREPARATION AND WORKMANSHIP

- A. Carefully examine all the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Insure that work of all preceding trades is completed prior to starting work of this Section.
- C. Insure surfaces are in uniform plane; true to dimensions; and free of waxes, oily films, grease, loose mortar chips, other items detrimental to installation.

3.02 INSTALLATION

- A. Except as otherwise specifically directed by the Architect, install all building insulation in the size and thickness specified, in strict accordance with the manufacturer's instructions.
- B. Install rigid insulation to maintain continuous and complete

thermal protection for building spaces and elements.

- C. Cut and trim rigid insulation; by means of saw, knife or other sharp tool, to neatly fit spaces and around mechanical, electrical and other items which protrude through plane of insulation. Butt edges and ends tight. Use only rigid insulation free of broken or chipped edges.

D. Installation of Roof Insulation:

1. Verify that surfaces and site conditions are ready to receive work.
2. Verify that deck is supported and secured.
3. Verify that deck is clean and smooth, free of depressions, irregularities, or projections, properly sloped to drains.
4. Verify that deck surfaces are dry and free of dirt and debris. (Verify flutes of metal deck are clean and dry).
5. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set and [wood cant strips] [wood nailing strips] [and reglets] are in place.
6. Start of work means installer accepts existing [surfaces] [substrate].
7. Protect building surfaces against damage from roofing work.
8. Verify that metal deck units are properly secured in place.

E. Installation of Rigid Cavity Wall Insulation:

1. Install insulation horizontally and continuously to wall construction.
2. Secure rigid insulation in place with adhesive using spot or ribbon method in accordance with insulation manufacturer's written instructions.
3. Stagger vertical joints of insulation, except free ends over line or control joints.
4. Apply 2" diameter daubs of adhesive space approximately 12" o.c. vertically and horizontally on inside face of insulation board.
5. Butter all edge joints of insulation board with adhesive to provide continuous vapor barrier.
6. Fit insulation between wall ties and other obstructions with joints staggered and edges butted tightly.
 - a. Press units firmly against inside wythe of masonry or other construction.
 - b. Wedge insulation from outside wythe of construction with small fragments of masonry materials space 24" o.c. both ways.
 - c. Make insulation continuous. Fill all voids.
7. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

8. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
9. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

F. Installation of Perimeter Insulation:

1. Secure rigid insulation on perimeter foundation wall with adhesive, using "spot or ribbon method", in accordance with the insulation manufacturer's recommendations.
2. Place insulation horizontally and install continuously.
3. Stagger vertical joints of insulation, except free ends over line of control joints.
4. Extend insulation down below finish grade 48" or to top of footing, whichever is less, unless noted or indicated otherwise.
5. Do not allow insulation to be displaced during backfilling operation.
6. Immediately following application of insulation boards, place protective board covering over exposed insulation surfaces and adhesive secure boards in accordance with manufacturer's instructions. Install boards horizontally or vertically from base of insulation to top of insulation. Butt board joints tight, stagger from insulation joints.

G. Installation - Under Slab on Grade:

1. Place rigid insulation under slabs on grade after base for slab on grade has been compacted.
2. Extend insulation in 24" from the outside edge of slab unless noted or indicated otherwise.
3. Prevent insulation from being displaced or damaged while placing vapor barrier and pouring slabs.

H. Installation of Batt / Blanket Insulation:

1. Install unfaced batt/blanket insulation in accordance with manufacturers instructions, friction fitted between framing members in walls, ceilings and floors.
2. Install faced batt/blanket insulation in accordance with manufacturers instructions, with facing having formed flanges at the edges for either face or inset stapling at maximum 6" o.c. or taping to framing members. Install factory applied vapor-retarding membrane facing warm side of building spaces.
3. Install insulation without gaps or voids, lapping ends and side flanges. Do not compress insulation.
4. Trim insulation neatly to fit tight in spaces and tight to exterior side of mechanical and electrical services within the plane of the insulation.

5. Tape seal butt ends, lapped flanges, and punctures, tears and cuts in membrane.

I. Installation of Miscellaneous Batt Insulation:

1. Coordinate with other Sections and install fibrous insulation around exterior doorframes, window frames, roof expansion joints, roof and wall penetrations, and other voids to maintain continuity of building thermal barrier.
2. Insulate all miscellaneous gaps or voids to maintain thermal continuity of building.

3.03 CLEAN-UP

- A. Do not permit insulation debris to accumulate in building or on job site.
- B. Upon completion of work, leave premises clean, free from scraps and debris.

3.04 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.05 VERIFICATION

- A. Upon completion of the installation in each area, visually inspect and verify that all insulation is complete and properly installed.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07900 - CAULKING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

- A. The General Conditions accompanying these specifications shall apply to and bind all Contractors for the work.

1.02 SCOPE

- A. The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances, and materials and performing all operations in connection with the application of caulking complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.
 - 1. It is the intent of the caulking work under this Section to provide waterproof seals at all joints where shown on drawings.

1.03 APPLICABLE SPECIFICATIONS

- A. The following Federal Specification forms a part of this specification:
 - 1. TT-C-598 Compound, Caulking; Plastic (for Masonry and Other Structures.

1.04 QUALIFICATION

- A. Subcontract the caulking work only to a firm experienced in the application of the types of materials required, and employing skilled tradesmen for the work.

1.05 SUBMISSIONS

- A. Submissions shall be in accordance with Section 01300--Submissions, and as modified below.
- B. Manufacturer's Data, Sealants and Caulking:
 - 1. Submit three copies of manufacturer's specifications, recommendations, and installation instructions for each type of sealant, caulking compound, and associated miscellaneous material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
- C. Samples, Sealants and Caulking:

1. Submit three 12" long samples of manufacturer's standard colors for each type of sealant or caulking compound for selection by Architect.

Install sample between two strips of material similar to or representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths. Samples will be reviewed by Architect for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

D. Guarantee, Sealants:

1. Submit three copies of written guarantee agreeing to repair or replace sealants which fail to perform as air tight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability, or appear to deteriorate in any other manner not clearly specified as in inherent quality of the material by submitted manufacturer's data. Provide guarantee for a period of two years, signed by the installer and Contractor.

PART 2 - MATERIALS

2.01 GENERAL

A. Materials shall conform to the following requirements:

1. Caulking Compound: Caulking compound shall conform to the requirements of Federal Specification TT-C-598, Grade I. The color of the caulking compound shall match the color of the new fascias. Delivery of the caulking compound to the building site shall be in the manufacturer's original sealed packages.

2.02 SAMPLES

- A. Samples, before the work of application is started, of all materials proposed for use, two (2) samples of each kind of caulking materials shall be submitted to the Architects for approval.

2.03 SEALANT MATERIALS

- A. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions, as demonstrated by testing and field experience.
- B. Colors: Provide color of exposed joint sealers indicated or, if no otherwise indicated, as selected by Architect from manufacturer's standard colors. Color to match window frames.
- C. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated,

complying with ASTM C 920 requirements.

D. For exterior and interior caulking between aluminum and concrete masonry:

1. One-part, Non-acid Curing Silicone Sealant: Type S, Grade NS, Class 25, and as follows:
 - a. Uses NT, M, G, A, and O.
 - b. Additional capability, when tested per ASTM C 719, to withstand the following percentage changes in joint width as measured at time of application and still comply with other requirements of ASTM C 920.
 - c. 40 percent movement in both extension and compression for a total of 80 percent movement.
2. Products offered by manufacturers to comply with the requirements include the following:
 - a. Dow Corning Corp., "Roofseal."
 - b. 795 Silicone Building Sealant.

E. For exterior and interior caulking between aluminum and aluminum:

1. One-part, Acid Curing Silicone Sealant: Type S, Grade NS, Class 25; Uses NT, G, A, and O.
2. Products offered by manufacturers to comply with the requirements include the following:
 - a. Dow Corning Corp., "Roofseal."
 - b. 795 Silicone Building Sealant.

2.04 ACCESSORY MATERIALS

A. Premolded Joints for Floors and Paving:

1. Rescor Expansion Joint (W. R. Meadows) or approved equivalent, 1/2-inch thick or as shown; leave 1/2-inch clear space at top to receive sealant.

B. Joint Cleaner:

1. Provide the type of joint cleaning compound recommended by the sealant or caulking compound manufacturer for the joint surfaces to be sealed.

C. Joint Primer:

1. Provide the type of joint priming compound recommended by the sealant or caulking compound manufacturer for the joint surfaces

to be sealed.

D. Bond Breaker Tape:

1. Polyethylene tape or other plastic tape as recommended by the sealant manufacturer to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.

E. Sealant Backer Rod:

1. All joints shown or specified to be sealed or caulked shall be filled with a compressible backer rod of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer; to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Caulking compound shall be applied by the gun method using nozzles of proper sizes to fit the several widths of the joints. The type of gun shall be subject to approval by the Architects.
- B. Preparation: Caulking in joints shall be a minimum of 3/4-inch in depth and 1/4-inch in width unless otherwise indicated on the drawings.
- C. Caulking: The compound shall be driven into the joint grooves with sufficient pressure to force out all air and to solidly fill the joint grooves. Caulking, where exposed, shall be free of wrinkles and shall be uniformly smooth. Upon completion of the caulking, any caulked joints not entirely filled shall be roughened and filled as specified and the exposed surface tooled smooth.
- D. Cleaning: The surfaces of all materials adjoining caulked joints shall be cleaned of any smears of compound or other soiling due to the caulking application.

3.02 GUARANTEE

- A. All work under this section shall be guaranteed for a period of one (1) year from date of final payment. Should any portion develop imperfections due to faulty workmanship or materials, the Contractor shall repair or replace such portions without delay and at no cost to

the Owner.

3.03 STATEMENT OF NON-COMPLIANCE

- A. Wherever it is necessary to proceed with the installation of sealants or caulking compounds under conditions which do not fully comply with the requirements (because of time schedule difficulties or other reasons which the Contractor determine to be crucial to the project, prepare a written statement for the Owner's record (with copies to the Contractor and Architect) indicating the nature of the non-compliance, the reasons for proceeding, the extra or precautionary measures taken to ensure the best possible work, and the names of the individuals concurring with the decision to proceed with the work.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of standard steel doors and frames is indicated and scheduled on drawings.
- B. Finish hardware is specified elsewhere in Division 8.
- C. Building in of anchors and grouting of frames in masonry construction is specified in Division 4.

1.03 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows," and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Oversize Fire-Rated Door Assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide certificate or label from an approved independent testing and inspection agency, indicating that door and frame assembly conforms to the requirements of design, materials, and construction as established by individual listings for tested assemblies.
 - 2. Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 450°F (232°C) maximum in 30 minutes of fire exposure.

1.04 SUBMISSIONS

- A. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel

doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
 2. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- C. Samples: Full range of color samples for Architect selection; 2 samples, 6" square minimum, of each color and texture selected for factory finished doors and frames.
- D. Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames by one of the following:

1. Steel Doors and Frames, (General):

Allied Steel Products, Inc.
Amweld/Div. American Welding & Manufacturing Co.
Ceco Corporation.
Copco Door Company.
Curries Manufacturing, Inc.
Dittco Products, Inc.
Fenestra Corporation.

Kewanee Corporation.
Mesker Industries, Inc.
Pioneer Builders Products Corporation/Div. CORE Industries, Inc.
Steelcraft/Div. American Standard Company.
Trussbilt, Inc.
Republic Builders Products Corporation/Subs. Republic
Steel.

2.02 MATERIALS

- A. Hot-rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.
- B. Cold-rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18 gauge galvanized sheet steel.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.
- F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.
- G. Finish: For all doors indicated as prefinish, provide manufacturer's standard baking epoxy or enamel paint. All other doors to be finished as described in Division 9 - Section 09900.

2.03 FABRICATION, GENERAL

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at project site. Comply with SDI-100 requirements as follows:
 - 1. Interior Doors: SDI-109, Grade II, heavy-duty, Model 1, minimum 18-gauge faces, and Model 5, minimum 16 gauge steel. Refer to door schedule for locations.
 - 2. Exterior Doors: SDI-100, Grade III, extra heavy-duty, Model 2, minimum 16-gauge faces, and Model 5, 16 gauge steel. Refer to door schedule for locations.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels,

louvers, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

- D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gauge inverted steel channels. Edge seams shall be welded, filled, and ground smooth.
- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- F. At exterior locations and elsewhere as shown or scheduled, provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236.
 - 1. Unless otherwise indicated, provide thermal-rated assemblies with U-factor of 0.24 BTU /(hr*ft sq deg F) or better.
- G. Finished Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.
- H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- I. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.
- J. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- K. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
- L. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.
- M. Apply finish coat to doors indicated as prefinished by electrostatically spraying and baking, to produce a paint thickness of 1.25 mils.

2.04 STANDARD STEEL DOORS

- A. Provide metal doors of types and styles indicated on drawings or schedules.
- B. Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24-gauge cold-rolled steel set into 20-gauge steel frame.

2.05 STANDARD STEEL FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gauge cold-rolled furniture steel.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.
- C. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.
 - 1. Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 2. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
 - 3. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
 - 4. Install fire-rated frames in accordance with NFPA Std. No. 80.
 - 5. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.
- C. Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.
- D. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.02 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- C. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and incomplete and proper operating conditions.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The extent and location of each type of wood door is shown on drawings and schedules.
- B. The types of doors required include the following:
 - 1. Solid core flush wood doors, with wood-veneer faces.
 - 2. Fire rated flush wood doors.
 - 3. Factory-finished flush wood doors.
- C. Related Sections:
 - 1. Section 08110 - Steel Doors and Frames.
 - 2. Section 08112 - Custom Steel Doors and Frames.
 - 3. Section 08710 - Finish Hardware.
 - 4. Section 08800 - Glass and Glazing.
 - 5. Section 09900 - Painting.
- D. Related Documents: Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 QUALITY ASSURANCE

- A. In addition to the requirements shown on the drawings and specified in this section, comply with the following standards:
 - 1. AWI "Quality Standards illustrated", Section 01300 and Brochure No. 5 "Flush Doors" of the Architectural Woodwork Institute.
 - 2. NWMA "Industry Standard I.S. 1-73 "Wood Flush Doors" of the National Woodwork Manufacturer's Association.
 - 3. NFPA 80 "Standard for Fire Doors and Windows" of the National Fire Protection Association.
 - 4. NWWDA "Guide to Door Face Veneers".
- B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
 - 1. Provide AWI Quality Certification Labels, or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows," and

have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" & NFPA 252 "Standard Methods of Fire Tests of Door Assemblies" of the National Fire Protection Association by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

1. Test Pressure: After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.
 2. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg. F maximum in 30 minutes of fire exposure.
- D. ASTM E119 "Standard Test Methods for Fire Tests of Building Construction Materials".

1.03 SUBMITTALS

- A. Comply with the requirements of Section 01300 and as modified below.
- B. Manufacturer's Data:
1. Submit six (6) copies of manufacturer's product data, specifications, and installation instructions for each type of wood door required. Data shall include details of core and edge construction and trim for openings. Include factory-finishing specifications.
 2. Submit six (6) copies of manufacturer's certificate indicating that doors and louvers meet, or exceed, requirements of indicated fire rating.
- C. Shop Drawings: Submit three samples, minimum 12" x 12", showing veneer, core, and edge construction for each type of wood door required. Indicate location, size, and hand of each door, elevation of each kind of door, construction details not covered in Product Data; location and extent of hardware blocking and other pertinent data.
1. Indicate dimensions and locations of mortises and holes for hardware.
 2. Indicate dimensions and locations of cutouts.
 3. Indicate requirements for veneer matching.
 4. Indicate doors to be factory finished and finish requirements.
 5. Indicate fire ratings for fire doors.
- D. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
1. Faces of Factory-Finished Doors: Show the full range of options available for stained and transparent finishes.
- E. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

1. Frames for light openings, 6 inches long, for each material, type and finish required.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheet. Mark each door on top and bottom rail with opening number used in shop drawings.
- C. Protect wood doors during transit, handling, and storage to prevent damage, soiling, and deterioration. Store in a dry location and stack in accordance with manufacturer's instructions.
- D. Provide protective coverings for shop finished doors at the factory prior to shipping. Use heavy paper cartons and mark with identification required for proper installation.

1.05 QUALITY STANDARD

- A. Comply with NWWDA I.S. 1-A "Architectural Wood Flush Doors, and AWI's "Architectural Woodwork Quality Standards Illustrated".

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.07 WARRANTY

- A. Submit three copies of written agreement in door manufacturer's standard form signed by the manufacturer, installer, and Contractor agreeing to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup or twist) more than $\frac{1}{4}$ inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
- B. The warranty shall include refinishing and reinstallation which may be required due to repair or replacement of defective doors.
- C. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
- D. Warranty shall be in effect during the following period of time from date of Substantial Completion.
 - a. Solid-Core Interior Doors: Life of Installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design: The design for flush wood doors is based on Mohawk Flush Doors, Inc. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. Eggers Industries, Two Rivers, Wisconsin.
 2. Algoma Hardwoods, Inc., Algoma, Wisconsin.
 3. Marshfield Door Systems, Inc., Marshfield, Wisconsin.

2.02 INTERIOR FLUSH DOORS

- A. Comply with applicable requirements of AWI 1300.
- B. Face Veneer: Match existing veneer and finish, unless otherwise specified. Provide *"Mohawk Platinum Series 7-ply Architectural Flush Doors."*
1. AWI quality grade: Grade A, plain sliced white oak or maple, book match (match for color and grain) at veneer joints. Provide exposed edges or other exposed solid wood components of the same species as face veneer. Veneers are to be white only (color contract heartwood/sapwood) will not be acceptable).
 2. Faces for transparent finish: AWI Specification System 1 filled finish; match veneer of existing doors.
- C. Door Construction: Solid core, AWI Type Solid Composite Lumber Core (SCLC) for non-rated doors and 20 minute rated doors and/or Mineral Core (MC) for 45 minute, 60 minute and 90 minute rated doors. Five (5) plies with stiles and rails bonded to core; then entire unit to be abrasive-planed before veneering.
1. Special edge construction (for Mineral Core [MC] fire rated doors): 5" top rail; 5" bottom rail, and 5" x 18" lock blocks both sides. At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer. At pairs, furnish formed-steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated. Provide finish steel edges and astragals with baked enamel same color as doors.
 2. Wood fire doors (similar or equal to Mohawk Platinum Series 7-ply Architectural Flush Doors) must be installed in a rated hollow metal (h.m.) frame (i.e., 3/4 hour - C labeled; 1-1/2 hour - B labeled). Door construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
 - a. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in

doors of fire ratings indicated:

1. 5-inch top-rail blocking.
 2. 5-inch bottom-rail blocking.
 3. 5-inch mid-rail blocking with 5-by-10-inch lock blocks.
- b. At pairs of fire-rated doors, provide fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals.
3. In accordance with NFPA-80, Section 1-7, Glazing Material, Fire protection rated glazing (vision panels) must be installed in approved steel frames.
- a. Glazing for openings through doors, such as ceramic fire rated safety glass, shall be fitted into trim openings and well embedded in putty.

D. Louvers:

1. Wood louvers: Provide door manufacturer's standard solid wood louvers, unless otherwise indicated; size indicated on drawings or in schedule.
2. Metal louvers: Unless otherwise specified provide minimum 20 gauge steel with prime and finish coats of enamel; color to match sample furnished by Architect; size as indicated on drawings or in schedule. Blade type to be vision-proof, inverted V. Metal and finish to be galvanized steel, 0.0396 inch thick, hot-dip zinc - coated and factory-primed for paint finish.
3. For fire-rated doors, louver must be fire rated with U.L. label and equipped with a (stainless steel) spring operated 160° fusible link and closing device, listed and labeled for use in doors with fire rating of one and one-half hours and less. Metal and finish to be galvanized steel, 0.0396 inch thick, hot-dip zinc coated and factory-primed for paint finish.
4. Where indicated to be lightproof, provide lightproof overlapping channel blade louvers, similar to the following:
 - a. "Model 1000 Lightproof Overlapping Channel Blade Louver" by Air Louvers, Inc.
 - b. "Model 619 Lightproof Formed Metal Stationary Louver" by AiroLite Co., Marietta, Ohio.
 - c. "Model LP-1 Lightproof Louver" by Wonder Metals Corp., Redding, Ca.

E. Wood Beads for Light Openings in Wood Doors:

1. Wood Species: Same as species as door faces.
2. Profile: Flush rectangular beads.
3. At 20-minute, fire-rated, wood-core doors, provide wood beads and

metal glazing clips approved for such use.

- F. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered non-combustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.
- G. Adhesives: Do not use adhesives containing urea formaldehyde.
- H. Doors for Transparent Finish:
 - 1. Grade: Premium, with Grade A faces.
 - 2. Species and Cut: Birch, plain sliced.
 - 3. Match between Veneer Leaves: Book match.
 - 4. Assembly of Veneer Leaves on Door Faces: Center balance match.
 - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - a. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 20 feet or more.
 - b. Stiles: Same species as faces.

2.03 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 - 1. Comply with clearance requirements of referenced quality standard for fitting.
 - 2. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) for door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Louvers: Factory install louvers in prepared openings.

2.04 FACTORY FINISHING

- A. General: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.
- B. Finish all door surfaces at factory.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: AWI System, TR-6 catalyzed polyurethane.
 - 3. Staining: As selected by the Architect from the entire series of colors.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Semi-gloss.
- D. Restore finish on all edges of shop-finished doors before installation.
- E. Drips and runs of paint, stain, primer, or sealer are not acceptable.

2.05 FIRE RATED DOORS

- A. Comply with applicable requirements of AWI 1300 and NFPA 80 "Standard for Fire Doors and Windows" for fire ratings indicated on drawings and in schedule.
- B. Provide doors which have been tested and rated by Underwriter's Laboratories, Inc. (UL) for the fire ratings and class indicated in the schedule using single-point hardware.
 - 1. Attach UL classification Marking label indicating door type, rating, class, and temperature rise to edge of each fire-rated door.
- C. Provide veneer and finish to match non-fire-rated doors in the same area of building, unless otherwise indicated.
- D. Door assemblies in corridors and smoke barriers shall be tested in accordance with NFPA 252 or UL 10C

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine doors and installed door frames prior to hanging doors.
 - 1. Verify that framed comply with indicated requirements for type, size, location and swing characteristics and have been installed with level heads and plumb jambs.
- B. Proceed with installation, only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Condition doors to average prevailing humidity in installation area

prior to hanging.

- B. Fit doors to frames and machine for hardware.

3.03 INSTALLATION

- A. Install wood doors in accordance with manufacturer's instructions. Adjust for proper fit, uniform clearance at each edge, and smooth balanced door movement. For installation of finish hardware, refer to Section 08710.
- B. Provide clearance for doors of 3/32" at jambs and heads and 3/8" at bottom, unless otherwise indicated.
 - 1. For fire rated doors, provide clearances complying with the limitation of the authority having jurisdiction. Install fire-rated doors into corresponding fire-rated frames, according to NFPA 80.
 - 2. Allow extra clearance as required for thresholds, carpet, and similar materials.
- C. Job-fitted use: Align and fit doors in frames with a uniform clearances and bevels as indicated below. Do not trim stiles and rails in excess of limits set by the manufacturer or permitted for fire-rated doors. Machine doors for hardware; seal cut surfaces after fitting and machining.
- D. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
- E. Comply with NFPA 80 for fire-rated doors.
- F. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
- G. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- H. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.04 ADJUSTING

- A. Operation: Re-hang or replace doors what do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with the requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
2. Electronic access control system components, including:
 - a. Electronic access control devices.
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
4. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
5. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
 - c. Quantity, type, style, function, size, and finish of each hardware item.
 - d. Name and manufacturer of each item.
 - e. Fastenings and other pertinent information.
 - f. Location of each hardware set cross-referenced to indications on Drawings.
 - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - h. Mounting locations for hardware.
 - i. Door and frame sizes and materials.
 - j. Name and phone number for local manufacturer's representative for each product.
 - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
 - 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:

- a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
3. Warranty: Special warranty specified in this Section.
- D. Closeout Submittals:
 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Factory order acknowledgement numbers (for warranty and service)
 - d. Name, address, and phone number of local representative for each manufacturer.
 - e. Parts list for each product.
 - f. Final approved hardware schedule, edited to reflect conditions as-installed.
 - g. Final keying schedule
 - h. Copies of floor plans with keying nomenclature
 - i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
 - j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 1. Warehousing Facilities: In Project's vicinity.
 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC).
 2. Can provide installation and technical data to Architect and other related subcontractors.
 3. Can inspect and verify components are in working order upon completion of installation.
 4. Capable of producing wiring diagrams.
 5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

- C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
- G. Keying Conference
 - 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.
- H. Pre-installation Conference
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Inspect and discuss preparatory work performed by other trades.
 - 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 - 4. Review sequence of operation for each type of electrified door hardware.
 - 5. Review required testing, inspecting, and certifying procedures.
- I. Coordination Conferences:
 - 1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
 - 2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.
- C. Project Conditions:
1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
 2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Protection and Damage:
1. Promptly replace products damaged during shipping.
 2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
 3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- F. Deliver keys to Owner by registered mail or overnight package service.

1.07 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
 - a. Closers:
 - 1) Mechanical: **30 years**
 - b. Exit Devices:

<Insert Project Header>

- 1) Mechanical: 3 years.
- c. Locksets:
 - 1) Mechanical: 3 years
- d. Continuous Hinges: Lifetime warranty.
- e. Key Blanks: Lifetime
- 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.09 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fasteners
 - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
 2. Use materials which match materials of adjacent modified areas.
 3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.
- C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series.

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
4. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.

10. Provide mortar guard for each electrified hinge specified.
11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage ND series.

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: Schlage Rhodes

2.05 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage Everest 29 T.

B. Requirements:

1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Conventional Patented Restricted: cylinder with interchangeable core with patented, restricted keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent-protected until the year, 2029.
4. Nickel silver bottom pins.

2.06 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

<Insert Project Header>

- B. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- C. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact:
 - 1. Firm Name:
 - 2. Contact Person:
 - 3. Telephone:
- D. Requirements:
 - 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.
 - 2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - 3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - b. Patent Protection: Keys and blanks protected by one or more utility patent(s) until the year, 2029.
 - 4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - 5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.
 - c. Master Keys: 6.

2.07 DOOR CLOSERS

- A. Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product: LCN 4040XP series.
- B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 5/8 inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.08 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Pemko

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds: See hardware set note
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.09 FINISHES

A. Finish: BHMA 612/639 (US10) at Seward; except:

1. Door Closers: Powder Coat to Match
2. Weatherstripping: Black

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing door and frame for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying section.
- I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Testing and labeling wires with Architect's opening number.
- J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- R. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

- A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.
 - 1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.06 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.07 DOOR HARDWARE SCHEDULE

- A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
- B. Hardware Sets:

END OF SECTION

<Insert Project Header>

HARDWARE SET NO. 01 - SINGLE PRIVACY

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	612	IVE
1	EA	PRIVACY LOCK	ND40S RHO	612	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	690	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CVX	612	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HARDWARE SET NO. 02 - SINGLE STOREROOM

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	612	IVE
1	EA	STOREROOM LOCK	ND80TD RHO	612	SCH
2	EA	FSIC CORE	23-030 CKC EV29 T	606	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	690	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CVX	612	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HARDWARE SET NO. 03 - SINGLE CLASSROOM SECURITY

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	612	IVE
1	EA	CLASSROOM SECURITY	ND75TD RHO	612	SCH
2	EA	FSIC CORE	23-030 CKC EV29 T	606	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	690	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CVX	612	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HARDWARE SET NO. 03A - SINGLE CLASSROOM SECURITY - EXISTING FRAME

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	612	IVE
			MATCH NEW HINGES TO EXISTING PREPS		
1	EA	CLASSROOM SECURITY	ND75TD RHO	612	SCH
2	EA	FSIC CORE	23-030 CKC EV29 T	606	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	690	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	612	IVE
1	EA	WALL STOP	WS406/407CVX	612	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

NOTE: CONTRACTOR TO FILL/PATCH ANY OLD HARDWARE PREPARATIONS IN EXISTING FRAME THAT WILL NO LONGER BE USED WITH NEW HARDWARE. CONTRACTOR IS RESPONSIBLE FOR ANY MODIFICATIONS TO FRAME AS REQUIRED TO MOUNT NEW DOOR HARDWARE, INCLUDING MORTISES, REINFORCEMENTS AND ALL PREPARATION OF THE EXISTING MATERIAL.

<Insert Project Header>

Door Numbers	HwSet#
001	03A
002	02
003	03
004	03
005	03
006	01
007	02
008	02
009	01
010	03
011	03
012	03
013	03
014	03

DIVISION 8 - DOORS AND WINDOWS

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Furnish and install glass and glazing work as shown on the drawings and as specified herein.
 - 1. Sheet Glazing:
 - a. Annealed (float) glass.
 - b. Annealed laminated safety glass.
 - c. Tempered laminated safety glass.
 - d. Tempered (heat treated) glass.
 - e. Insulated glass.
 - f. Insulated reflective glass.
 - g. Insulated spandrel glass.
 - h. Skylight insulated glass.
 - i. Security glazing.
 - j. Polycarbonate glazing.
- B. The required applications of glass and glazing include (but are not necessarily limited to) the following:
 - 1. Window units (fixed and operable sash).
 - 2. Aluminum, steel, FRP, and wood doors (door lights, sidelights, and transoms).
 - 3. Interior (borrowed light) windows.
 - 4. Storefront and curtainwall framing systems.
 - 5. Skylights.
 - 6. Ballistic framing systems.
- C. Related Documents:
 - 1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- D. Related Sections include the following:
 - 1. Division 7 Section *"Joint Sealants"*.
 - 2. Division 7 Section *"Building Insulation"*
 - 3. Division 8 Section *"Steel Doors and Frames"*.
 - 4. Division 8 Section *"Aluminum Doors and Frames"*.
 - 5. Division 8 Section *"FRP Doors and Frames"*.
 - 6. Division 8 Section *"Flush Wood Doors"*.
 - 7. Division 8 Section *"Aluminum Entrances & Storefronts"*.
 - 8. Division 8 Section *"Aluminum Windows"*.
 - 9. Division 8 Section *"Vinyl Clad Wood Windows"*.
 - 10. Division 8 Section *"Vinyl Clad Wood Doors"*.
 - 11. Division 8 Section *"Glazed Aluminum Curtain Walls"*
- E. Insulated metal panels glazed into exterior aluminum window frames are specified in Section 08520, Aluminum Windows.

1.02 REFERENCE STANDARDS:

A. American Architectural Manufacturers Association:

1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants.

B. Federal Regulations:

1. 16FR 1201 - Safety Standards for Architectural Glazing Materials.

C. American Society for Testing and Materials (ASTM):

1. ASTM C 509 - Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
2. ASTM C 864 - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
3. ASTM C 920 - Specification for Elastomeric Joint Sealants.
4. ASTM C 1036 - Specification for Flat Glass.
5. ASTM C 1048 - Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
6. ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
7. ASTM C 1115 - Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
8. ASTM C 1172 - Specification for Laminated Architectural Flat Glass.
9. ASTM C 1281 - Specification for Preformed Tape Sealants for Glazing Applications.
10. ASTM C 1330 - Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
11. ASTM C 1376 - Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
12. ASTM E 774 - Specification for the Classification of the Durability of Sealed Insulating Glass Units.
13. ASTM E 1300 - Practice for Determining Load Resistance of Glass in Buildings.
14. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
15. ASTM C1036 - Flat Glass.
16. ASTM E838 - Cracking, Blistering, Crazing and Color Change.
17. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction & Materials.

- D. Glass Association of North America (GANA):
 - 1. Glazing Manual.
 - 2. Laminated Glass Design Guide.
 - 3. Engineering Standards Manual.
- E. The Insulating Glass Manufacturers Alliance (IGMA):
 - 1. IGMA TB-3001 - Sloped Glazing Guidelines.
 - 2. IGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.
- F. Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; Building Technologies Department; Windows & Daylighting Group, windows.lbl.gov/software:
 - 1. "LBNL Window 5.0 (or higher) - A PC Program for Analyzing Window Thermal and Optical Performance.
- G. National Fenestration Rating Council (NFRC):
 - 1. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties.
 - 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence.
 - 3. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products.
- H. National Fire Protection Association (NFPA):
 - 1. NFPA 80 - Fire Doors and Windows.
 - 2. NFPA 252 - Fire Tests of Door Assemblies.
 - 3. NFPA 257 - Fire Test for Window and Glass Block Assemblies.
- I. Safety Glazing Certifications Council (SGCC):
 - 1. SGCC - Certified Products Directory for Safety Glazing Material Used in Buildings.
- J. Associated Laboratories, Inc. (ALI):
 - 1. ALI - Certified Products Directory - Fenestration Products.
- K. National Association of Architectural Metal Manufacturers (NAAMM):
 - 1. NAAMM SS-1B-68 - Non-Skinning Resilient Preformed Compounds - Tapes, Ribbons, Beads with Release Paper.

L. Federal Specifications (FS):

1. FS TT-S-230A - Sealing Compound, Synthetic Rubber Base, Single Component, Chemically Curing for Caulking, Sealing and Glazing in Building Construction.
2. FS TT-S-002303 - Sealing Compound, Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).

1.03 SUBMISSIONS:

- A. Submissions shall be in accordance with Section 01300 - "Submissions" and as modified below.
- B. Product Data - Glazing Materials:
1. Submit manufacturer's product data, specifications, and installation instructions for each type glass, glazing material and associated/ related products. Include test data substantiating that glass complies with specified requirements. Include documentation of compatibility of sealants with glazing products, and instructions for handling, storing, installation and recommended procedures for cleaning of each type of glass and glazing material.
- C. Samples: Prior to the delivery of materials, submit to the Architect samples of each of the following:
1. Submit three (3) 12" square samples of each type of glass required. Architect's review of samples will be for color, texture, and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
 2. Submit three (3) beads, approximately ¼-inch wide by 3 inches long, of each sealant to be employed, indicating color of set or cured material.
- D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- E. Shop Drawings: Prior to placement of glass order or glass fabrication, the Contractor shall submit six (6) copies of pertinent shop drawings (i.e. - windows, doors, borrowed light frames, etc.) which have been:
1. Checked and approved by the General Contractor, stamped and dated.
 2. Reviewed by the Architect, with stamp affixed.

1.04 DEFINITIONS:

- A. Glass: Includes both primary and fabricated glass products as described in FGMA *"Glazing Manual"*.
- B. Glazing: Include glass installation and materials used to install glass.
- C. Sealed Insulating Glass Unit Surfaces:
 - 1. Surface 1: Exterior surface of outer lite.
 - 2. Surface 2: Interspace-facing surface of outer lite.
 - 3. Surface 3: Interspace-facing surface of inner lite.
 - 4. Surface 4: Interior surface of inner lite.
- D. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- E. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- F. Manufacturing defects are defined as edge separation, seal failure, delamination, core cracking, loss of visibility/clarity due dusting or misting, or UV exposure, or chemical reaction to glass cleaners.

1.05 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Company specializing in the manufacture of glass products, types as specified, with minimum documented five years experience.
- B. Glazer's Qualifications: Company specializing in the installation of glass products, similar types as specified, with minimum documented five years experience.
- C. Single Source Responsibility: Obtain materials from one source for each type of glass and glazing.
- D. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.
 - 1. Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing

channel substrates.

- a. Perform tests under normal environmental conditions replicating those that will exist during installation.
 2. Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).
 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
 5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.
- E. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.
- F. Glazing Industry Publications: Comply with glass product manufacturers' recommendations and the follow: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.
1. GANA Publications: GANA Laminated Division's 'Laminated Glass Design Guide' and GANA's 'Glazing Manual.'
 2. IGMA Publication for Insulating Glass: IGMA TM-3000, 'Glazing Guidelines for Sealed Insulating Glass Units.'

1.06 REGULATORY REQUIREMENTS:

- A. Comply with applicable provisions of all codes and standards acceptable to local, state and federal agencies having jurisdiction.
- B. Perform Work in accordance with the following Glazing Standards:
 1. Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual".
 2. Safety Glazing: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and

II glazing products, and requirements of authorities having jurisdiction.

3. Insulating Glass: Provide insulating glass units permanently marked either on spacers or on at least one pane with appropriate certification label of Insulating Glass Certification Council (IGCC) or Associated Laboratories, Inc. (ALI).

1.07 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: Provide glazing capable of withstanding wind-load design pressures calculated according to requirements of the 2015 International Building Code or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent. Refer to drawings for Wind Design Data.
 - b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for a load duration of 60 seconds.
 - c. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow loads for a duration of 30 days.
 - d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in

ambient and surface temperatures acting on glass framing members and glazing components. 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, ambient; 180 deg F, material surfaces.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
1. Center-of-Glass U-Values: NFRC 100 methodology using LBL Window 5.0 analysis, expressed as Btu/ sq. ft. x h x deg F.
 2. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200
 3. Solar Optical Properties: NFRC 300.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Delivery:
1. Deliver glass with manufacturer's labels intact.
 2. Deliver glazing components and sealants in manufacturer's unopened, labeled containers.
- B. Storage and Handling:
1. Store glass in designated areas, away from traffics and construction.
 2. Do not remove labels until glass has been installed.
 3. Keep glass free from contamination by materials capable of staining or damaging glass.

1.09 ENVIRONMENTAL REQUIREMENTS:

- A. Perform glazing only when ambient temperature is above 40 degrees
- B. When circumstances require glazing below 45 degrees F, steps shall be taken to assure dry and frost-free surfaces, as approved by the Architect.

1.10 WARRANTY:

- A. Provide manufacturer's written warranty for a period of not less than five years, under provisions of Division 1.
- B. Warranty: Provide a published and written warranty signed by manufacturer agreeing to furnish F.O.B. point of manufacture,

freight allowed to project site, within 45 working days after receipt of notice from Owner for replacement of those units which develop manufacturing defects.

- C. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

Subject to compliance with requirements, provide products by one of the following:

A. Glass Products:

1. Manufacturers producing glass complying with the requirements include the following:
 - a. Vitro Architectural Glass, Cheswick, PA, 1-855-887-6457, Email:archservices@vitro.com, <http://www.vitroglazings.com>
 - b. Libbey-Owens-Ford Co. (LOF), Toledo, OH.
 - c. Hordis Brothers, Inc., Pennsauken, NJ.
 - d. AFG Industries, Inc., Kingsport, TN.
 - e. Guardian Industries Corp., Carleton, MI.
 - f. Custom Glass Co., Kittanning, PA.

B. Polycarbonate Glazing Products:

1. Manufacturers producing glass complying with the requirements include, but are not necessarily limited to, the following:
 - a. General Electric Co., GE Plastics Structured Products, Pittsfield, MA 01201, www.structuredproducts.ge.com (800) 451-3147.
 - b. Cadillac Plastic and Chemical Company.
 - c. Commercial Plastic and Supply Company.
 - d. Insulgard Corporation.

2.02 MATERIALS

A. General:

1. Of domestic manufacture - Federal Spec. DD-G-451c. Thickness tolerances shall conform to published standards of approved manufacturer.
2. All glass, whether specifically shown or specified, shall conform to manufacturer's standards as to maximum size for each type of glass.
3. If a speak hole is required, provide Nissen #425 S/S Speak Hole or equal as approved by the Architect.

2.03 PROCESSED GLASS PRODUCTS:

A. **One-quarter inch (1/4") Annealed Float Glass:**

1. General:

- a. Float glass is glass which has been floated on molten tin and annealed slowly to produce a transparent flat glass which eliminates grinding or polishing.
- b. ASTM C 1036, Type I, Quality-Q3, class 1.
- c. CPSC 16 CFR 1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick.

B. **One-quarter inch (1/4") Heat-Treated Safety Glass:**

1. General:

- a. ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I (transparent flat), Class 1 (clear), Quality q3 (glazing select).
- b. ANSI Z97.1 and CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick.

C. **Laminated Safety Glass:**

1. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
 - a. ASTM C1172, Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

2. **One-quarter inch (1/4") Safety Laminated, Polished Plate Glass:**

- a. A 0.015" thick plastic (interlayer) film sandwiched between two layers of 1/8" annealed float glass.
- b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; 1/4-inch thick. Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified.
- c. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - 1. Interlayer Material: Polyvinyl butyral sheets or cured resin.

3. **One-half inch (1/2") Tempered Laminated Safety Glass:**

- a. Formed of two pieces of ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I (transparent), Class 1 (tinted grey), Quality q3 (glazing select), glass 1/4-inch thick laminated together with a clear 0.015 inch thick PVB interlayer, for a 1/2-inch total nominal thickness.
- b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations.

D. **One-quarter inch (1/4") Tempered Glass:**

- 1. General:
 - a. Float glass which has been heat treated and rapidly cooled to produce compressively stressed surface layer resulting in a strength of at least four to five times that of annealed glass and complying with strength requirements of FS-DD-G-1403B for Grade B, Tempered Glass.
 - b. CPSC 16CFR-1201, safety regulation for architectural glazing in hazardous locations; when used in a dual glazed unit 1/4" thick.

E. **One Inch (1") Insulated Glass:**

1. General:

- a. Factory-assembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, with manufacturer's standard spacer material and construction, per ASTM E 2190.
- b. All insulating glass units, whether specifically shown or specified, shall conform to the manufacturer's standards as to maximum size for each type of glass.
- c. Fabricate glazing units in dimensions required, with edge and face clearances, edge and surface conditions, and bite in accordance with glazing product manufacturer/fabricator's instructions and referenced glazing publications.

2. **High Performance Insulating Glass:** Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:

- a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.
 1. Kind FT (Full Tempered)
 2. 1/4-inch thick glass.
 3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
 4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).
- b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.
 1. Kind FT (Full Tempered)
 2. 1/4-inch thick glass.
- c. Performance Requirements: (minimum requirements based on non-tinted clear glass)
 1. Visible Light Transmittance: 64 percent minimum.
 2. Winter Nighttime U-Factor: 0.24 (Btu/hr* ft^2 *°F) maximum.
 3. Summer daytime U-Factor: 0.21 (Btu/hr* ft^2 *°F) maximum.
 4. Shading Coefficient: 0.31 maximum.
 5. Solar Heat Gain Coefficient: 0.27 maximum.
 6. Outdoor Visible Light Reflectance: 13 percent maximum.

3. **High Performance Reflective Insulating Glass:** Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:
- a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
 - 3. Coating: "Solarcool" by Vitro Architectural Glass on first surface (1).
 - 4. Pyrolytic coating on the second surface (2)
 - b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
 - 3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376
 - 4. Coating: "Solarban" 60 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the third surface (3).
 - c. Performance Requirements: (minimum requirements based on Solarbronze glass)
 - 1. Visible Light Transmittance: 16 percent minimum.
 - 2. Winter Nighttime U-Factor: 0.24 (Btu/hr* ft^2 *°F) maximum.
 - 3. Summer daytime U-Factor: 0.22 (Btu/hr* ft^2 *°F) maximum.
 - 4. Shading Coefficient: 0.18 maximum.
 - 5. Solar Heat Gain Coefficient: 0.16 maximum.
 - 6. Outdoor Visible Light Reflectance: 37 percent maximum.
4. **High Performance Spandrel Insulating Glass:** Formed of two 1/4-inch lites of glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1 inch nominal thickness, consisting of:
- a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
 - 3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
 - 4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).

- b. Inside Lite: ASTM C1036, Type I, Class 1 (clear), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
 - 3. Monolithic coating on the fourth surface (4)
 - 4. Coating: "OPACI-COAT 300" by ICD High Performance Coatings, 7350 South Union Ridge Parkway, Ridgefield WA 98642. 360.546.2286 phone - 360.546.2287 fax; icd@icdcoatings.com; <http://www.icdcoatings.com/>
 - c. Performance Requirements: (minimum requirements based on non-tinted clear glass)
 - 1. Visible Light Transmittance: 64 percent minimum.
 - 2. Winter Nighttime U-Factor: 0.24 (Btu/hr* ft^2 *°F) maximum.
 - 3. Summer daytime U-Factor: 0.21 (Btu/hr* ft^2 *°F) maximum.
 - 4. Shading Coefficient: 0.31 maximum.
 - 5. Solar Heat Gain Coefficient: 0.27 maximum.
 - 6. Outdoor Visible Light Reflectance: 13 percent maximum.
5. **High Performance Insulating Skylight Glass:** (to be used at all glass skylights and horizontal glass applications) Formed of one 1/4-inch lite of tempered glass and one 5/16-inch lite of laminated glass separated by a 1/2-inch Argon Gas filled space hermetically sealed, for a total 1-3/16 inch nominal thickness, consisting of:
- a. Outer Lite: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
 - 3. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
 - 4. Coating: "Solarban" 70 Solar Control Low-E (Sputtered) by Vitro Architectural Glass on the second surface (2).
 - b. Indoor Lite: Laminate: ASTM C1172 and complying with testing requirements.
 - I. Laminate Outboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.

- II. Interlayer: ASTM C1036, Type I, Class 1 (tint - color as selected by architect), Quality q3.
 - 1. Type: PVB
 - 2. Thickness: 0.015" (0.38mm)"
 - 3. Color: White
- III. Laminate Inboard Lite: ASTM C1036, Type I (transparent), Class 1 (clear), Quality q3.
 - 1. Kind FT (Full Tempered)
 - 2. 1/4-inch thick glass.
- c. Performance Requirements: (minimum requirements based on non-tinted clear glass)
 - 1. Visible Light Transmittance: 58 percent minimum.
 - 2. Winter Nighttime U-Factor: 0.22 (Btu/hr* ft^2 *°F) maximum.
 - 3. Summer daytime U-Factor: 0.14 (Btu/hr* ft^2 *°F) maximum.
 - 4. Shading Coefficient: 0.30 maximum.
 - 5. Solar Heat Gain Coefficient: 0.26 maximum.
 - 6. Outdoor Visible Light Reflectance: 13 percent maximum.

6. Security Glazing:

- a. 5/16" thick Laminated Shooter/Attack Certified Security Glass
 - 1. AOTSG516L Security Glass, as manufactured by Armoured One, or approved equal.
- b. One Inch (1") Insulated Shooter/Attack Certified Tactical Security Glass
 - 1. AOTSG1 Security Glass, as manufactured by Armoured One, or approved equal

2.05 GLAZING MATERIALS AND ACCESSORIES:

A. General:

- 1. Provide black exposed glazing materials, unless another color is indicated, or unless another color is selected by the Architect from manufacturer's standard colors. Provide hardness of materials as recommended for the required application and condition of installation in each case. Provide only compounds, which are known (proven) to be fully compatible with surface contacted.

B. Glazing Sealants:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.
4. For Glazing Interior Openings:
 - a. Acrylic latex one-part terpolymer (FS TT-00230) or acrylic latex emulsion (ASTM C-834), compounded specifically as glazing sealant with permanent flexibility (non-hardening), non-staining, and non-bleeding.
 - b. Products complying with these requirements include:
 1. "AC-20" by Pecora Corp., Harleysville, Pennsylvania.
 2. "MONO" by Tremco, Inc., Cleveland, Ohio.
 3. "Krylflex" by Chem-Masters Corp., Chagrin Falls, Ohio.
5. For Glazing Exterior Openings, except where gasket is used:
 - a. Silicone sealant, complying with FS TT-S-001543, Class A, non-sag, compounded for glazing applications.
 - b. Products complying with these requirements include:
 1. "Dow Corning 999 Silicone Building and Glazing Sealant" by Dow Corning Corp., Midland, Michigan.
 2. "Silicone Construction Sealant 1200" by General Electric Co., Silicone Products Div., Waterford, New York.
6. For Glazing Glass to Glass:
 - a. Structural Silicone sealant, complying with ASTM

C1401-09a, Standard Guide for Structural Sealant Glazing.

- b. Products complying with these requirements include:
 - 1. "Dow Corning 993 Structural Glazing Silicone Sealant" by Dow Corning Corp., Midland, Michigan.
 - 2. "Dow Corning 3362 Insulating Glass Silicone Sealant" by Dow Corning Corp., Midland, Michigan.
- C. Glazing Tape: Preformed macro polyisobutylene; NAAMM #55-1B-68, with integral spacing device, paper release; "Polyskim Tape", color as later selected by Architect.
- D. Setting Blocks: Neoprene, Shore A durometer hardness of 85, plus or minus 5, 4 inches long by 3/8-inch thick by 1/4-inch high.
- E. Glazing Gaskets:
 - 1. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
 - a. Neoprene, ASTM C 864.
 - b. EPDM, ASTM C 864.
 - c. Silicone, ASTM C 1115.
 - d. Thermoplastic polyolefin rubber, ASTM C 1115.
 - e. Any material indicated above.
 - 2. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
 - 1. Neoprene(not compatible with silicone glazing sealants)
 - 2. EPDM.
 - 3. Silicone.
 - 4. Thermoplastic polyolefin rubber.
 - 5. Any material indicated above.
- F. Primers, Sealers & Cleaners: Recommended by sealant manufacturer.
- G. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- H. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

I. Compressible Filler Rod:

1. Closed cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Check that glazing channels are free of burrs, irregularities, and debris.
- B. Do not proceed with installation until any unsatisfactory conditions are corrected and placed in satisfactory condition.

3.02 PREPARATION

- A. Field Measurements:
 1. Cut glass accurately to sizes obtained from actual verified field measurements of frames to receive glass.
 2. Allow for proper edge clearances.
- B. Preparation of Surfaces:
 1. Remove any protective coatings or covering from surfaces to be glazed.
 2. Clean glass and glazing surfaces to remove dust, oil and contaminants, and wipe dry.
 3. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.03 DELIVERY AND STORAGE:

- A. Delivered materials shall match the approved samples. Packaged materials shall be delivered in the original unopened labeled containers of the manufacturer, clearly marked with their name and brand.
- B. Each panel of glass shall be factory labeled. Store glass, while awaiting installation, in a dry, well-ventilated location at a constant temperature maintained above dew point.
- C. Glass that is cracked, broken, chipped, or otherwise damaged during transportation, storage, and erection (including natural causes, accidents, and vandalism) and unfit for use shall be removed from the job site and replaced with acceptable materials at the Contractor's expense.

3.04 GENERAL PROVISIONS:

A. Exterior Glazing Only:

1. Watertight and airtight installation of each piece of glass is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss of breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
2. Weather conditions:
 - a. Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

B. Interior and Exterior glazing:

1. Protect glass from edge damage at all times during handling, installation, and operation of the building.
2. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thickness, with reasonable tolerances. The installer is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.
3. The installer must examine the framing or glazing channel surfaces, backing, stop design, and the conditions under which the glazing is to be performed, and notify the Prime Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the glazing until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.05 INSTALLATION:

- A. Verify by measurements at the job site all dimensions affecting this work.
- B. Comply with combined recommendations of glass manufacturer and manufacturer of sealants, gaskets, and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturers' technical representatives direct otherwise.
- C. Install polysulfide sealants as recommended by Thiokol Chemical Corp., except as otherwise recommended by the sealant manufacturer.

- D. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation. Clean the glazing channel, or other framing members to receive glass, immediately before glazing. Remove coating which are not firmly bonded to the substrate. Remove lacquer from metal surfaces wherever elastomeric sealants are used.
- E. Apply primer or sealer to joint surfaces wherever recommended by sealant manufacturer.
- F. Do not attempt to cut, seam, nip, or abrade glass that is tempered, heat strengthened, or coated.
- G. Inspect each piece of glass immediately before installation, and eliminate any which have observable edge damage or face imperfections. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- H. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- I. Glass shall be set without springing or forcing and carefully centered laterally and vertically so as to provide uniform clearance. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- J. Install setting blocks of proper sizes at quarter points of sill rabbet. Set blocks in thin course of heelbead compound / sealant, if any.
- K. Provide spacers inside and out, and of proper size and spacing, for all glass sizes where the length plus width is larger than 50 united inches, except where gaskets are used for glazing.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- L. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set

with pattern, drawn, and bow oriented in the same direction as other pieces.

- M. Clearance Requirements: Allow the following minimum nominal clearances, in accordance with glass manufacturer's recommendations; glass face to channel face, glass edge to frame member, and glass bite:

<u>Glass Thickness</u>	<u>Face Clearance</u>	<u>Edge Clearance</u>	<u>Bite</u>
Up to 1/4-inch	1/8-inch	1/4-inch	1/4- to 3/8-inch
5/16- to 3/8-inch	3/16-inch	5/16-inch	5/16- to 7/16-inch
1/2- to 13/16-inch	1/4-inch	3/8-inch	1/2- to 5/8-inch
7/8-inch and over	1/4-inch	1/2-inch	1/2- to 7/8-inch

3.06 GLASS TO GLASS JOINTS:

- A. Where glass panels join without mullion, bed joint with clear silicone sealing compound. For exterior applications a structural silicone bond joint is required. All materials to be joined must be compatible and meet the sealant manufacturer's requirements for adhesion & design loading.
- B. Edgework requirements for butt joint glazing applications shall be reviewed and approved by the architect prior to field installation due to a variation in edge quality based on the size, shape and thickness of the glass.
- C. Factory clean cut edges shall meet the following recommendations for butt joint glazing applications:
1. 3/8" glass is acceptable for use with factory clean cut edges.
 2. 1/2" glass up to a maximum length of 100" on the butt joint edge can be used with factory clean cut edges.
 3. 1/2" glass over 100" in length and 5/8" and thicker glass in any length should not be used with a factory clean cut edge.

3.07 SEALANT APPLICATION:

- A. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- B. Tool exposed surfaces of glazing liquids and compounds to provide a

substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

- C. Clean and trim excess glazing materials from the glass and stops or frames promptly after installation, and eliminate stains and discolorations.
- D. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

3.08 GASKET GLAZING (DRY):

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

3.09 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT):

- A. Cut glazing tape to proper lengths prior to application, install against permanent stop, 3/16-inch to 1/4-inch below sightline.
- B. Do not lap the adjoining lengths of tape or rubber shim, as this will prevent full contact around perimeter of glass:
 - 1. Strips must be installed in four separate sections, not run continuously around corners.
- C. Place setting blocks at 1/4 points.
- D. Rest glass on setting blocks and press against tape with sufficient pressure to ensure full contact and adhesion at perimeter.
- E. Install removable stops; insert continuous spacer strips between glass and applied stop to keep glass in compression against the tape.

1. Install in four separate sections.
- F. Sealant cavity pocket, formed by setting of the applied stop, shall then be filled to the sight line with sealant.
- G. Cap bead shall not exceed 1/16 inch above sight line onto glass surface.
- H. Tool or wipe cap bead with solvent for smooth appearance.

3.10 INTERIOR DRY METHOD (TAPE AND TAPE):

- A. Cut glazing tape to length and install against permanent stop, projecting 1/16-inch above sightline.
- B. Place setting blocks at 1/4 points.
- C. Rest glass on setting blocks and push against stop for full contact and adhesion at perimeter.
- D. Place glazing tape on free perimeter of glass in same manner described above.
- E. Install removable stop, avoid displacement of tape, exert pressure on tape for full continuous contact.
- F. Knife trim excess or protruding tape.

3.11 CLEAN-UP AND PROTECTION:

- A. Protect exterior glass from breakage immediately upon installation by attachment of crossed streamers to framing held away from glass. DO NOT APPLY MARKERS OF ANY TYPE TO SURFACES OF GLASS. Remove nonpermanent labels, and clean surfaces.
- B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents, and vandalism. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Remove all excess glazing material from all installed glass. Maintain glass in a reasonably clean condition during construction, so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other surfaces. Any soiling occurring on the glass shall be promptly and completely washed off.
- D. Carefully and completely remove all markings and labels from glass surfaces. Do not apply markers to glass surfaces.

- E. Wash and polish glass on both faces with a mild neutral or slightly acidic solution as recommended by the glass manufacturer not more than four days prior to Owner's acceptance of the work in each area. Attach crossed streamers away from glass face.
- F. Care shall be taken during cleaning to avoid scratching of glass surfaces by grit particles.
- G. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08806 - FIRE RATED GLAZING (FIRELITE PLUS, FIREGLASS 20 & PYROSTOP)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

- A. Furnish and install appropriate fire-rated glazing materials in all fire rated assemblies including door vision lights, transoms, borrowed lites and/or window units.
 - 1. For non-rated assemblies, see Specification Section 08800.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 1 Section 01352 - "*LEED Requirements*" for recycled content and regional materials requirements, submittals, and additional LEED requirements.
- B. Division 1 Section 01524 - "*Construction Waste Management*" for recycling construction waste.
- C. Division 7 Section 07910 - "*Joint Sealants*".
- D. Division 8 Section 08110 - "*Steel Doors and Frames*".
- E. Division 8 Section 08211 - "*Flush Wood Doors*".

1.04 REFERENCE STANDARDS:

- A. Consumer Product Safety Commission (CPSC):
 - 1. CPSC 16FR 1201 - Safety Standards for Architectural Glazing Materials.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM E2010-01 - Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.
 - 2. ASTM E2074-00 - Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
 - 3. ASTM E163 - Methods for Fire Tests of Window Assemblies.
 - 4. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
 - 5. ASTM E838 - Cracking, Blistering, Crazeing and Color Change.
 - 6. ASTM E 119: Fire Tests of Building Construction and Materials.
- C. National Fire Protection Association (NFPA):

1. NFPA 80 - Fire Doors and Windows.
2. NFPA 252 - Fire Tests of Door Assemblies.
3. NFPA 257 - Fire Tests of Window Assemblies.

D. Underwriters Laboratories, Inc. (UL):

1. UL 9 - Fire Tests of Window Assemblies.
2. UL 10B - Fire Tests of Door Assemblies.
3. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

E. Glass Association of North America (GANA):

1. GANA - Glazing Manual.
2. FGMA - Sealant Manual.

F. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings FGMA - Sealant Manual.

1.05 PERFORMANCE REQUIREMENTS

- A. **FireLite Plus®** - Fire-rated glass ceramic laminated clear and wireless glazing material for use in impact safety-rated locations such as doors, transoms and borrowed lites with fire rating requirements ranging from 20 minutes to 3 hours with hose stream test.
- B. **Fireglass20®** - Fire-rated tempered glass clear and wireless glazing material for use in impact safety-rated locations with fire rating requirements of 20 minutes without hose stream test; for use in interior and exterior applications.
- C. **Pyrostop®** - Fire-rated, clear and wireless glazing material for use in locations such as doors, sidelites, transoms, borrowed lites, and wall applications with fire rating requirements ranging from 45 minutes to 2 hours with required hose stream test; for use in interior and exterior applications.
- D. Product shall pass positive pressure tests standards: UL 10C, UBC 7-2 and UBC 7-4.
- E. Safety Glazing: Comply with testing requirements of CPSC 16 CFR 1201, safety regulation for architectural glazing in hazardous locations for Category I & II materials.

1.06 SUBMISSIONS

- A. Submissions shall be in accordance with Section 01300 - *Submissions* and as modified below.
- B. Product Data - Glass:
 1. Submit manufacturer's technical data, specifications, and installation and maintenance instructions for each type of

glass required. Include test data substantiating that glass complies with specified requirements. Include Certificates of Compliance from glass manufacturers attesting that glass materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

C. Samples:

1. Submit three (3) 12" square samples of each type of glass required. Architect's review of samples will be for color, texture, and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

D. Shop Drawings: Prior to placement of glass order or glass fabrication, the Contractor shall pertinent shop drawings (i.e. - windows, doors, borrowed light frames, etc.) which have been:

1. Checked and approved by the General Contractor, stamped and dated.
2. Reviewed by the Architect, with stamp affixed.

E. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

F. LEED Submittals: (For LEED Projects only)

1. Submit recycled content and regional materials documentation for each type of product provided under work of this Section in accordance with Section 01352 "*LEED Requirements*".
2. Credit EQ 4.1: Manufacturers' product data for interior field-applied adhesive and sealant products included in this section, including printed statement of VOC content in accordance with Section 01352 "*LEED Requirements*".

1.07 QUALITY ASSURANCE

A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.

B. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL and/or WHI certifying it for use in tested and rated fire protective assemblies.

C. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152 and UL 10B, labeled and listed by UL and/or WHI or other certification agency acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Deliver all materials to project site in manufacturer's original packaging, undamaged, complete with installation instructions.
- C. Store off ground, under cover, protected from weather and construction activities

1.09 PROJECT CONDITIONS:

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY:

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. **FireLite Plus®** as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com
 - 1. FireLite Plus® glazing sizes shall be as shown on the drawings:
 - 2. Properties: All fire rated ceramic glass designated on the drawings shall carry the following properties:
 - a. Thickness: 5/16 inch.
 - b. Weight: 4.0 lbs. / sq.ft.
 - c. Approximate Visible Transmission: 85 percent.
 - d. Approximate Visible Reflection: 9.0 percent.
 - e. Fire-Rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications - refer to Contract Drawings for ratings.
 - f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1.
 - g. STC Rating: Approximately 38 dB.

- h. Surface Finish: Standard Grade-Comparable surface finish to alternative fire-rated ceramic products marketed as "Premium"
 - i. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
 - 3. Maximum sheet sizes based on surface finish: Standard 48 inches by 96 inches.
 - 4. Labeling: Each piece of FireLite Plus® shall be permanently labeled with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing. FireLite Plus® shall be glazed into the appropriate fire-rated frame(s) with an approved glazing compound (Silicone or Closed Cell PVC Tape) as supplied by the Installer.
 - 5. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00 and ASTM E2010-01; NFPA 252 and NFPA 257; and UL 9, UL 10B, and UL 10C.
- B. **Fireglass20®** as manufactured by J.R. Four Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com
- 1. Fireglass20® glazing sizes shall be as shown on the drawings:
 - 2. Properties: All 20 minute fire rated glass designated on the drawings shall carry the following properties:
 - a. Thickness: 1/4 inch.
 - b. Weight: 3.0 lbs. / sq.ft.
 - c. Approximate Visible Transmission: 89 percent.
 - d. Approximate Visible Reflection: 8.0 percent.
 - e. Fire-Rating: 20 minutes (WITHOUT HOSE STREAM TEST)- refer to Contract Drawings.
 - f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1
 - 3. Labeling: Each piece of Fireglass20® shall be permanently labeled fireglass 20™ with the fireglass 20™ logo, UL logo and fire rating in sizes up to 6,396 sq. in.
 - 4. Fire Rating: Fire rating listed & labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E2074-00; NFPA 252; & UL 9, UL 10B, & UL 10C.
- C. **Pyrostop®** as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857, e-mail sales@fireglass.com, web site www.fireglass.com
- 1. Pyrostop® glazing sizes shall be as shown on the drawings:

2. Properties: All fire rated ceramic glass designated on the drawings shall carry the following properties:
 - a. Thickness: 3/4" (45 min.), 7/8" (60 min.), 1-7/16" (90 min.) & 2-1/8" (120 min.)
 - b. Weight: Varies with thickness (approximate range 9 to 22 lbs./sq. ft.)
 - c. Approximate Visible Transmission: Varies with thickness (approximate range 88 to 75 percent).
 - e. Fire-Rating: Up to 2 hours - refer to Contract Drawings for ratings.
 - f. Impact Safety Resistance: CPSC 16CFR1201 (Cat. I and II) & ANSI Z97.1.
 - g. STC Rating: Up to 46 dB.
3. Labeling: Each piece of Pilkington Pyrostop® shall be permanently labeled with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite® label only for sizes that exceed the listing. FireLite Plus® shall be glazed into the appropriate fire-rated frame(s) with an approved glazing compound (Silicone or Closed Cell PVC Tape) as supplied by the Installer.
4. Fire Rating: 60 Minutes and Greater: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ASTM E 119 and UL 263.

D. Glazing Compound for Fire-Rated Glazing Materials:

1. VOC content of all interior field-applied sealants must be less than 250 g/L.
2. VOC content of interior structural glazing adhesive must be less than 100 g/L.
3. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
4. Glazing Compound: DAP 33 putty.
5. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.

Available Products:

- a. Dow Corning 795 - Dow Corning Corp.
- b. Silglaze-II 2800 - General Electric Co.
- c. Spectrem 2 - Tremco Inc.]

- E. Setting Blocks: Neoprene, EPDM or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
- F. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
- G. Cleaners, Primers and Sealers: Type recommended by manufacturer of glass and gaskets.

2.02 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

2.03 DELIVERY AND STORAGE

- A. Delivered materials shall match the approved samples. Packaged materials shall be delivered in the original unopened labeled containers of the manufacturer, clearly marked with their name and brand.
- B. Each pane of glass shall be factory labeled; removed only at the time specified hereinafter. Store glass, while awaiting installation, in a dry, well-ventilated location at a constant temperature maintained above dew point.
- C. Glass that is cracked, broken, chipped, or otherwise damaged during transportation, storage, and erection, and all glazing and sealing materials unfit for use shall be removed from the job site and replaced with acceptable materials at the Contractor's expense.
- C. All Glazing broken or damaged during construction up to the date of substantial completion shall be removed from the job site and replaced with acceptable materials at the Contractor's expense.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Observable edge damage or face imperfections.
- B. Do not proceed with glazing until unsatisfactory conditions have

been corrected.

- C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.02 INSTALLATION

A. General:

1. Verify, by measurements at the job site, all dimensions affecting this work.
2. Comply with FGMA or GANA (For Pyrostop) standards and instructions of manufacturers of glass, glazing, sealants and glazing compounds.
3. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
4. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
5. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
6. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.
7. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit. Glass shall be set without springing or forcing and carefully centered laterally and vertically so as to provide uniform clearance.
8. Place glazing tape on free perimeter of glazing in same manner described above.
9. For Fireglass20® Provide minimum edge clearance of >1/4 inch (+1/8 inch/-1/16 inch) and a minimum edge cover of <3/8 inch (+1/16 inch/-1/16 inch).
10. For Pilkington Pyrostop® provide minimum 3/16 inch edge clearance
11. Install removable stop and secure without displacement of tape. Prior to glazing, remove stops and clean out all dirt, oil, droppings, or other material, which will affect proper glazing.
12. Use specified glazing compound, without alteration; bed glazing material in glazing compound; entirely fill all recess and spaces. Provide visible glazing compound with smooth and straight edges.
13. Install in vision panels in fire-rated doors to requirements of NFPA 80.
14. Install so that appropriate UL and FireLite Plus®, Fireglass20® & Pilkington Pyrostop® markings remain permanently visible and upright.

3.02 PROTECTION AND CLEANING

- A. Glass shall be suitably screened from paint, construction debris, and the like. All such soiling occurring on glass shall be promptly and completely washed off by methods approved by the glass manufacturer.

- B. Upon completion of installation and acceptance, markings and labels of whatever sort shall be carefully and completely removed from glass panels and the glass washed clean with a mild neutral or slightly acidic solution as recommended by the glass manufacturer, after which no marking or labels of any sort shall be placed on the glass. Care shall be taken during cleaning to avoid scratching of glass surfaces by grit particles.
- C. Ventilate buildings after glazing by opening windows slightly to prevent condensation on glass. Maintain ventilation until compound has set.

3.03 GUARANTEE

- A. The Contractor shall guarantee all workmanship and material in accordance with the General Conditions and Section 01700 - Contract Closeout.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09250 - GYPSUM WALLBOARD

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The work of this section is subject to all applicable provisions of the "General Conditions" and "Division 1 - General Requirements" which form part of this specification.
- B. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:
 - 1. Gypsum wallboard.
 - 2. All trim, battens, corners, and similar items.
 - 3. All required fastenings, framing, and attachments.
 - 4. All adhesive, tapes, and joint compound systems as required.
 - 5. Wall to wall corner expansion joint.

1.02 RELATED WORK

- A. Related work specified under other sections of the specifications:
 - 1. Section 09510 - Acoustic Ceiling Systems.
 - 2. Section 09900 - Painting.

1.03 QUALITY ASSURANCE

- A. To assure compatibility, studs, runner track, clips, etc. shall be the product of the same manufacturer.
- B. Comply with the minimum requirements of the following except where more stringent requirements are specified herein. All gypsum wallboard shall be asbestos free.
 - 1. Gypsum wallboard: ASTM C-1396
 - 2. Joint treatment: ASTM C-475/C475M.
 - 3. Non-load bearing steel studs, runners, and rigid furring channels for screw attachment of gypsum wallboard: ASTM C-645.

1.04 SUBMITTALS

A. Samples:

1. Submit samples for the Architect's approval in accordance with the applicable provisions of the contract documents.
2. Submit three (3) samples of each of the following:
 - a. Gypsum wallboard: 12" by 12" each type and finish.
 - b. Trim: 6" lengths of each type and finish.
 - c. Compound: 1 pint cans.
 - d. Tape: 12" lengths.
 - e. Screws and fastenings: Each size and type.
 - f. Submit shop drawings and engineering calculations for special areas as requested by the Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

- ##### A.
- Deliver all materials in unopened, original containers bearing manufacturer's labels. Store materials in a clean, dry, protected place and do not leave exposed to weather. Handle all materials with proper care to prevent damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Gypsum Wall board Types:

1. **Type I**: All rated and non-rated interior gypsum board partitions in toilet rooms, kitchens, serving areas, and other wet or moist areas shall receive **5/8" thick Mold Tough AR (Abuse Resistant) Firecode Gypsum Wall board**. Gypsum panels shall be composed of a fire resistant, moisture and mold resistant core with 100-percent recycled green face and brown back papers. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square cut and finished smooth. Long edges of panels are tapered, allowing joints to be reinforced and concealed. As manufactured by U.S. Gypsum or approved equal.
2. **Type II**: All wall surfaces scheduled to receive wall tile finishes shall receive **5/8" thick Firecode Core Type 'X' Glass-Mat Tile Backerboard** for a suitable wall finish substrate in lieu of the scheduled partition sheathing. Gypsum panels shall be moisture and mold-resistant with a treated water-resistant gypsum core covered with a coated fiberglass mat facer and back with square edges. As manufactured by U.S. Gypsum or approved equal.

3. **Type III:** Non-rated ceilings and soffits shall **receive regular core 1/2" thick Gypsum panels** composed of a fire resistant gypsum core encased in a heavy natural-finish face paper and strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square cut and finished smooth. Long edges of panels are tapered, allowing joints to be reinforced and concealed. As manufactured by U.S. Gypsum or approved equal. For any rated ceilings and soffits, use and refer to Gypsum Board Type II.
- B. Adhesive: USG Durabond 90.
- C. Metal trim: All 25 gauge, manufactured by U.S. Gypsum under the following numbers or approved equal:
1. Corner beads: No. 25 gauge "Dura-Bead".
 2. Casings: No. 400.
 3. Control joints: No. 093.
- D. Studs and stud tracks: Standard 20 gauge non-load bearing channel shape, formed from galvanized steel, with widths as required and as manufactured by National Gypsum, U.S. Gypsum, or approved equal.
- E. Galvanized ceiling and wall furring channels: 1-3/8" face x 7/8" deep as manufactured by U.S. Gypsum or approved equal. "Z" furring channels, 26 gauge hot dipped galvanized, 1-1/2" deep as manufactured by U.S. Gypsum or approved equal.
- F. Tape and joint compound: Manufactured by the approved manufacturer of the gypsum board.
- G. Screws and other fastenings: Of a type recommended by the manufacturer for the particular purpose intended.
- H. Wall to wall (corner) expansion joint: Wabo ECC-200 corner coverplate, aluminum alloy 6063-TS or 6061-T6, mill finish. Paint as per Section 09900.

PART 3- EXECUTION

3.01 ERECTION OF METAL STUDS

- A. Align all partitions accurately according to layout. Runners shall be attached to concrete slab or other type of floor 24 inches on center with concrete stud nails or power-driven anchors, to suspended ceilings with toggle bolts, or to slab above where indicated.

- B. Position studs vertically in runners, spaced 16 inches on center maximum.

Anchor all studs adjacent to door frames and at partition intersections and corners, to runner flanges with metal lock fasteners, or positive screw engagement through each stud and runner flange.

When necessary, studs shall be spliced by nesting 2 studs with a minimum lap of 8 inches, attaching flanges with 2 screws per flange.

- C. Provide horizontal bracing of studs at mid-point in partition height. Bracing shall be standard metal stud cut to fit and secured to studs.
- D. Metal studs at door frames shall be erected 2" maximum from frames and as follows:
 - 1. Anchor door frame clips to studs securely by bolt or screw attachment.
 - 2. Doors 2'-6" and wider shall be framed with double studs, placed back to back.
 - 3. Over door frames, install a section (cut to length) of runner with slip flanges and bent web to allow flanges to overlap adjacent vertical studs; screw attach all components.
 - 4. Position a stud at the locations of vertical joints in wallboard over door frames. Stud shall extend from frame header to the ceiling runner.
- E. Unless otherwise indicated or specified, the suspension system for gypsum board ceilings and soffits shall consist of runner channels and furring channels, suspended by hanger bars or hanger rods.

3.02 WALLBOARD INSTALLATION

- A. Unless otherwise specified, methods of installation shall be in accordance with the requirements of the Gypsum Association and the approved manufacturer.
- B. Stockpile wallboard, flat on floor in piles. Leave in original wrappings or containers until ready for use. Protect wallboard from moisture from any source.
- C. Butt all wallboard joints loosely together with a 1/4" cap. Butt ends shall not be placed against tapered edges.
- D. Install in maximum practical lengths to span walls without butt joints. If butt joints do occur, stagger joints and locate as far as possible from center of walls.

- E. Support end joints on studs. Apply end joint compound to the back of the board along end joints.
- F. No end joints shall align with edges of openings. Install expansion and/or control joints where shown or required.
- G. Install metal trim at corners, edges, and elsewhere as shown in accordance with the manufacturer's instructions and recommendations.
- H. Openings cut in wallboard to fit mechanical and electrical items shall fit snugly and be small enough to be covered by escutcheons and plates. Both face and back paper shall be cut when cutouts are not made with a saw.
- I. Adhesive and joint finishing compounds shall be mixed in strict accordance with the manufacturer's instructions. Mix only enough at one time to be used during the recommended pot life of the compound.
- J. Fasteners shall be installed as follows:
 - 1. Install no closer than 3/8-inch to end or edge.
 - 2. Begin from center of wallboard and proceed to outer edge.
 - 3. Pressure shall be applied on wallboard adjacent to fasteners being driven to ensure a tight fit of wallboard to the studs.
- K. Drive screws with a power screw driver as recommended by the manufacturer. Surface of head shall finish below the surface of the paper without puncturing the paper.
- L. Minimum temperature in areas where gypsum board is to be installed shall be 65°F for 24 hours before, during, and after installation. Provide adequate heat and ventilation to remove any moisture.
- M. Install continuous sound absorbing blanket in partitions indicated on drawings. Installation shall be in accordance with manufacturer's directions. Sound absorbing blanket insulation shall be paperless, semi-rigid mineral fiber batts 1" thick "Thermafiber" sound attenuation blanket, flame spread rating of 15 (ASTM E-84) as manufactured by U.S. Gypsum or approved equal.
- L. Install vertical control joints in gypsum sheathing to relieve stress caused by movement in accordance with ASTM C840-08, Section 20.3.1-20.3.5
 - 1. Control joints shall be installed where a partition, wall or ceiling traverse a construction joint (expansion, seismic or building control element) in the base building structure.
 - 2. Control joints shall be installed where a wall or partition runs in an uninterrupted straight plan exceeding 30 linear

- feet.
3. Control joints in interior ceilings with perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 50 feet and total area between control joints does not exceed 2,500 sq. ft.
 4. Control joints in interior ceilings without perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 sq. ft.
 5. Control joints in interior ceilings with perimeter relief shall be installed so that the linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 sq. ft.
 6. Control joint or intermediate blocking shall be installed where ceiling framing members change direction.
 7. Where control joints occur in an acoustical or fire rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8" Type X gypsum board, mineral fiber, or other tested equivalent.

3.03 JOINT TREATMENT

- A. Execute joint treatment in accordance with the manufacturer's printed instructions and these specifications.
- B. Reinforce wall corners and angles with tape folded to conform to the contour and embed in compound.
- C. Flanges of corner beads and trim shall be concealed by 2 coats of compound. Feather cut compound 9 inches from beads.
- D. Sand compound when thoroughly dry; avoid roughing surfaces of finish wallboard.
- E. Leave all surfaces smooth and uniform, ready to receive paint.

3.04 PATCHING AND REPAIRING

- A. After trim is applied, correct all surface damage and defects as required, to the Architect's satisfaction, so that blemishes will not show through the decoration.
- B. If, in the opinion of the Architect, the wallboard is irreparable, the Contractor shall remove same and replace it with new material at no extra cost to the Owner.

3.05 INSPECTION

- A. Wall surface, when prepared for painting, shall be inspected and approved by the Architect before proceeding further.

END OF SECTION

DIVISION 9 - FINISHES

Section 09300 - CERAMIC/PORCELAIN TILE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide all labor, materials, equipment and services and perform all operations required to complete the installation of all work of this Section and related work as indicated on the drawings and specified herein, including, but not limited to, the following:
 - 1. Ceramic tile floors, bases, and walls in rooms and spaces indicated on Finish Schedule on drawings.
 - 2. Grouting and cleaning all tile work under this section.
 - 3. Cutting, fitting and drilling.
 - 4. Protection and replacement.
 - 5. Additional materials.
 - 6. Caulk joints to match grout at floor, inside corners, and at door frames.
 - 7. Sealer for gypsum board to receive tile.
 - 8. Marble saddles.

1.02 RELATED WORK

- A. Related work specified under other sections of the specifications:
 - 1. Section 07900 - Joint Sealers
 - 2. Section 10800 - Toilet Accessories

1.03 CONTRACT DOCUMENTS

- A. Applicable provisions of the "Conditions of the Contract" shall govern all work under this Section.

1.04 QUALITY ASSURANCE

- A. All ceramic tile shall be Standard Grade, of domestic manufacture, and shall conform to ANSI A137.1.
- B. Thin-set mortar shall conform to ANSI 118.1.
- C. Installation Specifications: 2020 Handbook for Installation by the Tile Council of North America.

1.05 SUBMITTALS

- A. Samples:
 - 1. The Contractor shall, before placing order for tile, submit to the Architect for approval a complete and full set of all tiles, representative of the different sizes, shapes, colors, textures, and finish to be used in the work.
 - 2. Each sample shall be labeled stating the grade.
- B. Before proceeding with the tile work, the Contractor shall furnish the Architect with a certificate of Grade (signed by both tile manufacturer and subcontractor) in form adopted by the Tile Manufacturer's Association, Inc., stating the grade, type of tile, identification marks for tile containers, and the name and location of the project.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials in unopened, original containers bearing manufacturer's labels. Store materials in a clean, dry, protected place and do not leave exposed to the weather. Take all precautions to prevent intrusion of foreign matter. Handle all materials with proper care to prevent damage of any kind.
- B. Delivered materials shall match approved samples in all respects.
- C. Tile containers shall be branded with, or have sealed within, the shipping mark and other designations corresponding with the information given on the master grade certificate.

1.07 JOB CONDITIONS

- A. Tile work shall not be installed in freezing or near freezing weather.

1.08 GUARANTEE

- A. The Contractor shall guarantee in writing to the Architect that his work will remain in place without coming loose or cracking, whatever the cause or other defects due to faults of materials or workmanship or method of setting for a period of one year after the acceptance of the building by the Owner, and that he will, within time, upon notification in writing, immediately replace any defective work or materials and restore all damage to adjoining work caused thereby at his own expense and without cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Ceramic tile, porcelain tile and base shall be as manufactured by *American-Olean Company, Daltile, Crossville* or approved equal.

- B. Ceramic tile type, size, color and pattern for walls, wainscots and base shall match existing where appropriate or as indicated on the Finish Floor Plans, Schedule and/or Interior Wall Elevations. If ceramic tile type, size, color and pattern are not specified herein, 30 percent of the total amount of all ceramic tile shall be of price group 3, 3"x6" format, from the *Classic Color Wheel* collection by *Daltile*. The remaining 70 percent of the total amount of all ceramic tile shall be of price group 2, 3"x6" format, from the *Classic Color Wheel* collection by *Daltile*.
- C. When scope requires new installation of BOTH floor and wall tile, provide 3"x6" ceramic tile flat top cove base at full perimeter unless otherwise noted. Include both left and right corners as required by layout.
- D. When scope requires installation of new wall tile ONLY (existing floor tile to remain), provide *Schluter Dilex- AHKA Sanitary Cove Base* at full perimeter. Finish to be selected by Architect.
- E. When scope calls for painted wall surface with installation of new porcelain floor tile ONLY, provide ceramic tile sanitary cove base and all corners as required by layout.
- F. At all wainscot tile applications, include 3"x6" bullnose ceramic tile (on 6" side) or *Schluter Jolly* at top course of tile. Wainscot typically +/-5'-4" A.F.F. unless otherwise noted. Include both left and right corners as required by layout.
- G. In both full and wainscot height tile applications, 3"x6" bullnose tile (on 3" side) or *Schluter Jolly* shall be used along all vertical outside corners.
- H. If porcelain floor tile type is not specified or intended to match existing, provide and install 12"x12" format tile from *Daltile's Porcelain* collection or tile of equal value. Pattern and Colors to be approved/provided by architect during submission phase.
- I. Floor tile shall be non-slip with a coefficient of friction of 0.05.
- J. All mortar mixtures for tile work shall be as recommended by the Tile Council of North America and the American National Standards Institute, Inc.
- K. Caulking and expansion joints - one part silicone rubber.
- L. Marble saddles shall be Alabama White, Class "B" or better, polished.

2.02 ADDITIONAL MATERIAL

- A. Provide one box of tile used and store them where directed by the Owner.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Before proceeding with any tiling work, make sure that all sleeves and flashing for various pipes have been installed and that pipes have been run and tested; that conduits which are to be covered are in position and have been approved; and that the locations of all other work required by other trades to be set in the walls or floors are their correct locations, height, or projections. Immediately report any errors or discrepancies to the Architect.
- B. Spaces in which tile is to be set shall be closed to traffic and other work. Spaces shall remain closed until tile is firmly set. Protect tile from damage until work is accepted by the Architect.

3.02 WORKMANSHIP

- A. Internal angles shall be butted and external angles shall be bullnosed using integral combination tile.
- B. At door trim, the tile of all base members shall be bullnosed back to the trim with integral combination tile. No block angles will be allowed.
- C. Tile shall extend into all recesses and recess openings, shall return around jambs or trimmed openings, and shall form curbs where required.
- D. All base tile required in any room shall be set before work on the floor is started. The tiles shall be brought to true lines and levels and with joints flush. Base shall stop tile at opening flush with trim.
- E. Installation of tile work shall be performed in manner conforming with the best current practice in the industry.

3.03 SETTING

- A. Thin-set bed for floor tile shall be in conformance with ANSI 108.5. Surfaces shall be clean, smooth, and level.
- B. All tile shall be set in strict accordance with the recommendations of the approved tile manufacturers, the Tile Council of North America, Inc., and the American National Standards Institute, Inc.

3.04 INSTALLATION

- A. General:
 - 1. Press individual tile onto setting bed using extreme care to maintain accurate joint alignment and spacing.
 - 2. Tile work shall be laid out in such manner to avoid excessive cutting. No cuts smaller than one-half size shall

be made. All areas of tile shall be centered and balanced. All cuts shall be made on the outer edge of the field.

3. Smooth all cut edges with a carborundum stone, and install no tile with jagged or flaked edges.
4. Fit tile closely where edges will be covered by trim, escutcheons, or other similar devices.
5. The splitting of tile is expressly prohibited.
6. Make corners of all tile flush and level with corners of adjacent tile, with due allowance to warpage tolerances.
7. Keep all joint lines straight and of even width, including miters. All joints shall be uniform, not more than $\frac{1}{4}$ ".
8. Finish floor areas level and plumb with $\frac{1}{8}$ " of true plan in 8 feet.
9. The finished tile work shall be clean and free of tiles that are pitted, chipped, cracked or scratched.

B. Recommended Installation Standards (as per Tile Council of North America):

1. Floors:

a. Concrete Subfloor:

F112-90 - Cement Mortar, Bonded
F113-90 - Dry-Set Mortar or Latex-Portland
F122-90 - Thin-Set (on waterproof membrane)

2. Walls:

a. Interior Walls (Solid Backing):

W222-90 - One Coat Method
W242-90 - Gypsum Board, Organic Adhesive

3.05 CUTTING, FITTING, AND DRILLING

- A. Do all necessary cutting, fitting, etc. of tile work wherever required in connection with this work as may be necessary to overcome inaccuracies and to make the materials properly fit and conform to the conditions of the building, and as may be required for other mechanics in connection with their work, and to finish up after them, all in a neat and accurate manner as approved.
- B. All intersections and returns shall be neatly formed. All cutting and drilling shall be neatly done without marring the surfaces. Around outlets, piping, fittings or fixtures, etc., the tile shall be fitted close so that the usual plates, collars, or coverings shall overlap the tile.

3.06 GROUTING AND CLEANING

- A. As soon as the setting beds have sufficiently set, tile, and floors shall be thoroughly cleaned of all dirt, mortar, and foreign matter by washing and scrubbing with clean water and then all joints in quarry tile shall be grouted with gray Portland Cement and fine white sand mixed with clean water, forced into joints and finished flush and true. All traces of cement shall be wiped for the surface of tile before hardening. Grout materials shall conform to ANSI 118.1.
- B. The floor tile grout shall be spread uniformly over the floor and thoroughly worked into the joints, filling them solidly. After grouting has been completed, all surplus grout shall be removed and the floors left clean.
- C. Grout shall be colored by the addition of approved mineral coloring pigment where directed by the Architect.
- D. Grout for tile shall be mixed with an integral waterproofing compound.
- E. The use of acid solutions is prohibited. Any tile work and other work damaged by the use of a strong cleaning agent shall be replaced at the Contractor's expense.
- F. All work of other Contractors, which may have become soiled during the operation of any of the work covered under this Contract, shall be properly cleaned off without damage to such work and left in a clean, neat, and perfect condition, as approved by the Architect.

3.07 PROTECTION AND REPLACEMENT

- A. All tile work shall be adequately protected by approved means and all finished tiled areas shall be closed to all traffic or work by an approved barrier. Protection and barrier shall be removed when directed without causing any damage.
- B. Protect all work of other trades and contracts from damage caused by work under this section and make good all such damage to the satisfaction of the Architect and without cost to the Owner.
- C. Any work of other trades damaged or injured by the removing of any rejected work and the setting on new work or by a trimming, cutting, fitting, drilling, etc., or by cleaning or other cause shall be made at the Contractor's expense.
- D. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended. All methods and materials to be per tile manufacturer's recommendations.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09510 - ACOUSTIC CEILING SYSTEMS

(2X4 or 2X2 SUSPENDED TILE)

PART 1 - GENERAL

1.01 DESCRIPTION

A. Ceiling Types:

1. The extent of each type of acoustic ceiling is shown on the drawings and in schedules.
2. The types of acoustic ceilings required are as follows:
 - a. Mineral fiber acoustic panels in exposed grid suspension system.

B. Related Work:

1. Section 09900 - Painting.

C. Related Work in Other Contracts:

1. Heating, Ventilating, and Air Conditioning Work:
 - a. Grilles, diffusers, and similar air distribution components installed in acoustic ceiling system. Refer to Division 15.
2. Electric Work:
 - a. Lighting fixtures, smoke detection systems, sound systems, and similar electrical components installed in acoustic ceiling system. Refer to Division 16.

1.02 QUALITY ASSURANCE:

A. Installer Requirements:

1. Acceptable to manufacturer of primary acoustic materials.

1.03 SUBMISSIONS:

- A. Submissions shall be in accordance with Section 01300 - Submissions, and as modified below.

B. Product Data:

1. Submit manufacturer's specifications and installation instructions for each acoustic ceiling system required.

C. Samples:

1. Architect's review will be for color and texture only.

Compliance with all other requirements is the exclusive responsibility of the contractor.

2. Submit samples of the following:

- a. Exposed grids: Submit three 12" long samples of each type exposed runner.
- b. Moldings: Submit three 12" long samples of each type required.
- c. Acoustic units: Submit 3 sets of 12" square samples for each different acoustic unit required. Each set of samples shall show the full range of color and texture to be expected in the completed work.

D. Maintenance Instructions:

1. Submit two copies of the manufacturer's recommendations for cleaning and refinishing each type of acoustic unit used in the work. Include precautions against materials and methods which may be detrimental to finishes and acoustic efficiency. Submit to Architect for transmittal to Owner.

E. Replacement Materials:

1. When work is completed, deliver stock of replacement material to Owner for each type of acoustic unit used in the work. Furnish full size units, matching installed materials, package and mark for identification. Obtain receipt; submit copy of receipt for Architect.
2. Furnish not less than 1% of the total amount of each type of acoustic panel unit installed.

1.04 DELIVERY AND STORAGE:

- A. Deliver acoustic ceiling materials to the job site in original, unopened packages, bearing manufacturer's name and label identifying each type of acoustic unit.
- B. Storage Areas:
 1. Comply with acoustic material manufacturer's recommendations for storage of units to be used in the work.

1.05 PROJECT/SITE CONDITIONS:

- A. Environmental Requirements:
 1. Do not install ceiling panels until building is closed in and HVAC system is operational.
 2. Locate materials onsite at least 24 hours before beginning

installation to allow materials to reach temperature and moisture equilibrium.

3. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:
 - a. Relative Humidity: 65-75%
 - b. Uniform Temperature: 55-70°F (13-21°C).

PART 2 - PRODUCTS

2.01 SUSPENSION SYSTEMS:

A. Quality Standard:

1. Provide direct hung suspension system complying with ASTM C 635 for the following structural classifications:
 - a. Intermediate duty, unless otherwise indicated.

B. Manufacturers:

1. Provide suspension systems for acoustic ceilings as produced by one of the following:
 - a. Chicago Metallic Corp., Chicago, Illinois.
 - b. Donn Corp., Westlake, Ohio.

C. Hangers:

1. Provide hangers as recommended by suspension system manufacturer to comply with specified structural classification.
 - a. If suspension system manufacturer does not indicate hanger recommendation, provide not less than 9 gauge galvanized, soft annealed, mild steel wire.
2. Where hanger wires cannot be directly wire-tied to structural or intermediate framing members, provide attachment devices designed for the type of construction used in the work and with a carrying capacity of not less than 5 times the design loads involved.

D. Edge Moldings:

1. Provide manufacturer's standard angle or channel molding for edges and penetrations of ceiling, with single flange of molding exposed, white baked enamel finish.

E. Exposed Grid Suspension System:

1. Provide Class A fire rated single web steel main runners,

matching interlocking cross runners, adapters, and accessories with exposed cross runners coped to lay flush with main runners.

2. Finish: Smooth, matte white baked enamel.

F. Protective Coatings and Finish:

1. Provide manufacturer's standard coatings and finishes for normal use environments (ASTM C 635), except as noted.
2. In toilet rooms, provide protective coatings and finishes complying with High Humidity Test Requirements (ASTM C 635).

2.02 ACOUSTIC CEILING UNITS:

A. Manufacturers:

1. For convenience, details and specifications have been based on products indicated by the following manufacturers:
 - a. Mineral fiber acoustic panels and tiles: Armstrong World Industries, Lancaster, Pennsylvania.
2. Other manufacturers offering mineral fiber acoustic panels and tiles complying with the requirements include:
 - a. Celotex Corp., Tampa, Florida.
 - b. United States Gypsum Co., Chicago, Illinois.

B. Mineral Fiber Acoustic Panels:

1. Provide units, not less than 5/8" thick, with flame spread of 25 or less (ASTM E84) complying with performance requirements and physical characteristics of the specified panels indicated in the construction documents.

2.03 ACCESSORIES:

A. Hold Down Clips:

1. Provide manufacturer's standard spring steel clips spaced as recommended by said manufacturer in the following spaces:
 - a. All gymnasiums.
 - b. All recreation rooms.
 - c. All High School corridors.
 - d. All Middle School corridors.

PART 3 - EXECUTION

3.01 INSTALLATION OF SUSPENSION SYSTEMS:

A. General:

1. Coordination: Prior to start of acoustic ceiling work, consult other trades and contractors involved to determine areas of potential interference. Do not start installation of suspension systems until interferences have been resolved.
2. Provide framed openings around all sides of openings receiving items set in or attached to ceilings.
3. Install suspension systems in accordance with manufacturer's printed instructions and to comply with the requirements of ASTM C 636.

B. Hangers:

1. Space not more than 6" from each end and not more than 4' o.c. between ends of members to be supported. Provide additional hangers for support of light fixtures and other items to be supported by the ceiling suspension system including clips to securely fasten all framing members (used to support fixtures) to each other to prevent eccentric deflection or rotation of supporting runners.

C. Moldings:

1. Provide edge moldings where ceilings meet walls, partitions, and other vertical elements.
2. Corners: Miter cut inside and outside corners.

D. Runners:

1. Support main runners directly from hangers; do not bear on walls or partitions. Space main runners to support acoustic panels and other work resting in or on the ceiling, as

required to comply with specified performance requirements. Interlock cross-runners with either main runners or with cross-runners structurally classified as main runners. Install moldings with exposed leg in same plane as bottom flange of runners.

- E. Where ceiling suspension systems are attached directly to the bottom chord of joists, ceiling extensions (either an extended bottom chord element or a separate unit, to suit manufacturer's standards, or sufficient strength to support ceiling construction) shall be provided. Extend ends to within 1/2" of finished wall surface unless otherwise indicated.

3.02 INSTALLATION OF ACOUSTIC CEILING UNITS:

A. General:

1. Do not install acoustic ceilings until installation areas meet the following requirements:
 - a. Exterior openings have been closed and roofs are

weathertight.

- b. Mechanical, electrical, and other work above ceilings has been completed.
 - c. Wet work has been installed.
 - d. Temperature and relative humidity have reached levels which comply with acoustic material manufacturer's recommendations for the units to be used in the work and are acceptable to the installer.
- 2. Install materials in accordance with manufacturer's printed instructions and other recommendations applicable to the work.
 - 3. Balance border areas to avoid units of less than 1/2 unit width wherever possible. Wherever ceiling area is a multiple of full size acoustic units used in the work, balance alignment to be square and true and install only full size units for entire ceiling including borders.
- B. Installation of Acoustic Panels in Exposed Grid Suspension Systems:
- 1. Install square edge panels to rest on flanges of grid tees with border units supported by moldings.
 - a. Field cut border units square and support on wall moldings.
 - 2. Provide hold-down clips for panel areas where indicated; omit clips where access areas are shown.
 - a. Install 2 clips per panel at center of opposite sides of long dimension.
 - b. Install 4 clips per panel at midpoint of each side.

3.03 CLEAN UP AND PROTECTION:

- A. Clean exposed surfaces of acoustic units and suspension systems; comply with manufacturer's instructions. Remove and replace units and members which are damaged or cannot be cleaned.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09650 - RESILIENT FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide new resilient flooring and base where noted on drawings.

1.02 RELATED SECTIONS

- A. 03300 - Cast-in-Place Concrete
- B. 03511 - Self-Leveling Concrete Floor and Underlayment
- C. 03512 - Self-Leveling Concrete Floor Underlayment (Over Extruded Polystyrene Foam)
- D. 06100 - Rough Carpentry

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01300 - Submittals and as modified below.
- B. Product Data:
 - 1. Submit manufacturer's technical data and installation instructions for each type of resilient flooring, adhesives and accessories.
 - 2. Include manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessories.
- C. Samples:
 - 1. For projects requiring initial selection of color and pattern by Architect, submit samples in form of actual sections of resilient flooring, including accessories, showing manufacturer's full range of colors and patterns available, for each type of resilient flooring required.
 - 2. For projects requiring verification of previously selected styles and colors; submit, for verification purposes, samples of each type, color, and pattern of resilient flooring, including accessories, selected by Architect, indicating full range of variation in color and pattern selected. Provide full-size tile units and minimum 2 1/2" long sections of resilient flooring accessories.
- D. Maintenance Instructions:
 - 1. Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessories.

E. Replacement Material:

1. Submit to Owner at project site one box of each type and color of tile for each 50 boxes (or fraction thereof) of each type and color installed.

1.04 PRODUCT DELIVERY AND STORAGE

- A. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors, patterns, and quality designations legible and intact.
- B. Do not open containers or remove markings until materials are inspected and accepted by installation contractor.
- C. Store and protect accepted materials in accordance with manufacturer's directions and recommendations.
- D. Unless otherwise indicated, store materials in original containers at not less than 70°F for not less than 48 hours immediately before installation.
- E. All products should be inspected for dye lot, style, color, size, quality and shipping damage prior to installation and should not be installed if any irregularities are observed. Inspect the cartons to be sure all colors are the same shade.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature in space to receive tile between 70°F and 90°F for not less than 48 hours immediately before installation.
- B. Maintain minimum temperature of 55°F after flooring is installed except as specified in "A" above.
- C. Temperatures provided for installation and initial finishing shall be maintained at levels in accordance with manufacturer's requirements.

PART 2 - PRODUCTS

2.01 TILE FLOORING

- A. Vinyl Composition Tile: (VCT) Azrock by Tarkett or equivalent.
 1. Meets ASTM F1066 Class 2 (Through Pattern)
 2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.
 - a. The flooring specified is classified in accordance with

NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.

b. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.

3. Size: 12" x 12" unless otherwise shown. Thickness: 1/8".

4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's full range of standard VCT patterns and colors. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or in their entirety are not provided herein, the bid shall include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.

5. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.

6. 150 psi rating.

7. Manufacturers offering products complying with these requirements include:

a. Azrock by Tarkett, Houston, Texas

b. Mannington Commercial; Calhoun, GA.

c. Armstrong Commercial US, Lancaster, PA.

B. Vinyl Enhanced Tile: (VET) Azrock by Tarkett or equivalent

1. Meets ASTM F1066.

2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.

a. The flooring specified is classified in accordance with NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.

b. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.

3. Size: 12" x 12" unless otherwise shown, 1/8" thick.

4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's Azterra, Color Essence, or Color Essence SR series or manufacturer's current full range of standard V.E.T. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or in their entirety are not provided here, the bid shall include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.

5. Slip resistance: ADA Compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.
 6. 400 psi rating.
 7. Manufacturers offering products complying with these requirements include:
 - a. Azrock by Tarkett, Houston, Texas.
 - b. Roppe Corporation; Fostoria, Ohio.
- C. Homogeneous Solid Vinyl Tile: (SVT) Azrock by Tarkett or equivalent.
1. Meets ASTM F1700, Class 1, Type A (Type B for Slip Resistance).
 2. Interior Floor Finish Requirements: Interior floor finish shall meet or exceed the requirements of The Building Code of New York State.
 - c. The flooring specified is classified in accordance with NFPA 253 as: Class 1, Critical Radiant Flux 0.45 watts/cm2 or greater.
 - d. Flame spread rating less than 25 and smoked developed not to exceed 450, in accordance with by ASTM E-84.
 3. Size: 16" x 16" unless otherwise shown, 1/8" thick.
 4. Color and pattern: Unless otherwise specified, color shall be as selected by the Architect from manufacturer's Cortina Grande or Karim Kolours series or manufacturer's current full range of standard V.E.T. Pattern to match existing where appropriate or as shown on finish floor plans. In the event that the finish floor plans in part or in their entirety are not provided within. Include a minimum of two and/or three colors in a full tile basic pattern as determined by the Architect.
 5. Slip resistance: ADA compliant with a static coefficient of friction of 0.6 for level surfaces and 0.8 for ramps.
 6. 800 psi rating.
 7. Manufacturers offering products complying with these requirements include:
 - a. Azrock by Tarkett, Houston, Texas.
 - b. Polyflor Ltd., Manchester, UK.
- D. Luxury Vinyl Tile (LVT) by Tandus Centiva by Tarkett or equivalent.
1. Meets ASTM Testing as follows:

- a. ASTM F137
 - b. ASTM F2199
 - c. ASTM F970
 - d. ASTM F1914
 - e. ASTM e648
 - f. ASTM D2047
 - g. ASTM E662
 - h. ASTM F1515
 - i. ASTM F925
 - j. ASTM F1514
- 2. Offer a minimum 1500 PSI rating.
 - 3. Available with the following emboss selections: Pathway, Frost, Natural Grain, Fresco, Quarry, Rough Grain, Sawn, Straight Grain and Tick.
 - 4. Offer a variance in size selection.
 - 5. Offer a design selection between wood, stone or abstract products.
 - 6. Offer a minimum wear layer thickness of 32 mil.
 - 7. Offer a 3 mm overall thickness.
 - 8. Offer a 20 year commercial warranty.

2.02 ACCESSORIES

A. Rubber Cove or Wall Base:

- 1. Rubber cove or wall base shall be extruded and as manufactured by Roppe Corporation. It shall be constructed of first quality materials, properly vulcanized, and shall be smooth and free from imperfections which detract from its appearance. The base shall conform fully to the requirements of U.S. Federal Specification SS-W-40a, Type I Rubber. All cove base shall be of the cove Style B with a height of 4" (101.6 mm), in lengths continuous coil (1.22 m), in the color stated (see No. 4 below), and of 1/8" (3.175 mm) thickness.
- 2. Height: 4" unless otherwise noted.
- 3. Thickness: 1/8" gauge.
- 4. Color: As may be detailed in the finish floor plans or as selected by Architect from the manufacturer's premium colors.

5. Style: Standard top-set cove, except as may be detailed in finish floor plans or as selected by the Architect.
6. In the event that the finish floor plans in part or in their entirety are not provided herein, for bidding purposes, the Contractor shall utilize and, therefore, for inclusion in the scope of work and contract, that 100 percent of all rubber cove base shown to be provided shall be of Roppe Corporation Premium Colors Group IV or equal.

B. Accessories:

1. The Contractor shall utilize for bidding purposes and, therefore, for inclusion in the scope of work, all transitional reducers, reducer strips, cove caps, thresholds, edging, fillet strips and/or joiners as may need to be required by the project and/or Architect to provide a complete and acceptable project. All accessories shall be rubber and as manufactured by Roppe Corporation Color Group II or equal or luxury vinyl tile moldings to match specified pattern by moldingsonline.com.

C. Adhesives (Cements):

1. Waterproof, stabilized type as recommended by flooring manufacturer for the type of tile to be installed. Asphalt emulsions and other non-waterproof types are not acceptable.

D. Concrete Slab Primer:

1. Non-staining type as recommended by flooring manufacturer.

E. Leveling and Patching Compounds

1. Trowel Grade, featherable, latex modified Portland cement or blended hydraulic cement based formulation acceptable to the flooring manufacturer.
2. Gypsum based compounds shall not be used in slab on grade construction and will only be considered where specifically approved by the flooring manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION OF SURFACES

- A. Examine surfaces to receive resilient tile materials before installation begins for:
1. Defects or conditions that would adversely affect quality and execution of installation.
 2. Deviations beyond allowable tolerances of surfaces to receive resilient flooring:
 - a. Maximum variation in sub-floor surfaces: 1/8 inch in

10 feet.

3. Do not proceed with installation until unsatisfactory conditions have been reported in writing to the Architect and have been corrected.

B. Prepare substrates according to ASTM F 710 including the following:

1. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - a. When slab moisture content is in excess of manufacturer's requirements and if further drying is not possible, it may be necessary to install a moisture vapor barrier such as Chapco's Defender by Fuller Construction Products, Inc. If such a barrier product is determined to be required the product shall be deemed acceptable by the flooring and adhesive manufacturer'. The cost for application for such a barrier if not otherwise specified is considered an additional cost to the project. Added cost shall be agreed prior to proceeding.
 - b. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - c. VCT, VET & SVT
 1. Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours.

Special Note: If MVER is greater than 5 lbs. but less than 8 lbs. consult manufacturer for special adhesive recommendations.
 2. Perform relative humidity test using in situ probes, ASTM F 2170. Results must not exceed 80%.

Special Note: If MVER is greater than 80% but less than 90% consult manufacturer for special adhesive recommendations.
- b. LVT
 1. ASTM F1869 and ASTM F2170 and pH testing is required when installing LVT. Testing should be performed in several areas including the perimeter of the room, at columns and wherever else moisture might occur. The maximum allowable moisture vapor emission rate (MVER) from the subfloor is 6.0 lbs. The maximum pH range is 9 or less. The In-Situ/RH requirement is not to

exceed 75%. Three test results for the first 1,000 sq. ft. are required, with 1 test result for every 1,000 sq. ft. thereafter. The installer may alternate every 1,000 sq. ft. between RH and Calcium Chloride test sites after the first 1,000 sq. ft.

- C. Wood subfloors must have a minimum of 18" (45.7 cm) of cross-ventilated space beneath the bottom of the joist.
 - 1. The floor must be rigid, free of movement.
 - 2. Single wood and tongue and groove subfloors should be covered with ¼" (6.4 mm) or ½" (12.7 mm) APA approved underlayment plywood.
 - a. Use ¼" (6.4 mm) thick underlayment panels for boards with a face width of 3" (76 mm) or less.
 - 3. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.
- D. Condition of Surfaces to Receive Resilient Materials: Dry, clean and free of oil, grease, or wax.
- E. Substrates shall be free of curing compounds, sealers, hardeners.
- F. Fill all minor cracks in substrates using approved crack filler in accordance with manufacturer's printed instructions.
- G. Flash patch with products acceptable to the resilient flooring manufacturer. If condition requires self-levelling underlayment, refer to that specification in Division 3.
- H. Clean substrates of all dirt and loose particles before application of flooring materials.
- I. Provide additional underlayment and build up to abutting dissimilar flooring materials.
- J. Store and use adhesives in accordance with the manufacturer's printed instructions.
- K. Proceeding with installation constitutes acceptance of the substrate conditions.

3.02 INSTALLATION

- A. Strictly adhere to manufacturer's printed instructions and the following:
 - 1. Lay resilient tile so as to ensure full uniform contact with substrate and to produce finished surfaces, which are smooth, even, and in true plane, free of buckles, waves, or other imperfections.

2. Cut and scribe tile neatly into breaks and recesses, walls, door frames, casework, and around pipes, columns, and other projections where flashed base is not required.
3. Lay tile square with room axis. Do not install border tiles that are less than 1/2 the width of a field tile. Tile against walls shall be the same width on each side of room.
4. Tile pattern when laid shall lie in an alternating direction as determined by the Architect.

B. Rubber Base:

1. Use approved cove base adhesive and apply in accordance with manufacturer's printed instructions such as Roppe Corporation's No. 205 Cove Base Adhesive or equal. Adhesive shall hold base tightly in contact.
2. Where necessary, patch and fill back-up material with underlayment material to provide continuous, uniform surface.
3. Scribe base accurately; use specified preformed corners; butt joints between sections tightly.
4. Provide base at built-in work, casework, and elsewhere as indicated or required.

- C. Reducing Strips: Install at points of transition from new resilient flooring to dissimilar flooring material. Whenever possible, locate strips between door jambs centered under doors.

3.03 ADJUSTMENTS

- A. Reset any tiles which have not seated in a level plane with surrounding tiles.
- B. Carefully remove and replace any tiles with broken corners with surrounding tiles.

3.04 CLEANING AND PROTECTION

- A. Protect floors from rolling loads for 72 hours after installation by covering with hardboard or plywood. Protect the floor with undyed, untreated building paper until final inspection.
- B. Initial cleaning and maintenance is the responsibility of the installing contractor and must be performed as soon as possible after installation. Initial cleaning may be not be performed until 3 days (72 hours) after installation or as otherwise specified by the manufacturer. The intent is to allow the tile become well seated in the adhesive and to prevent excess moisture and cleaning agents from interfering with the adhesive bond. Sweep and protect the floor until initial cleaning and maintenance can begin.

Initial Cleaning and Maintenance after Installation:

1. Sweep or vacuum floor thoroughly.
2. Clean flooring utilizing a pH neutral cleaner such as Super Shine All by Hillyard. Allow to stand for 5-15 minutes, but do not allow to dry. Scrub with a single disc rotary machine (175-350 rpm) with a blue or green pad. Remove solution and rinse with clean water. Allow flooring to dry completely before applying finish.
 - a. Heavily soiled floor may require a stripping procedure as the initial cleaning.
3. Floor finish:
 - a. For VCT, Apply four coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.
 - b. For VET, Apply three coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.
 - c. For SVT, Apply two coats of a manufacturer approved high quality commercial floor finish such as Super Hil-Brite by Hillyard, allowing to dry completely between coats.
 - d. S.V.T. has an alternative for maintenance which follows a dry buffing procedure. The awarded scope includes the standard cleaning and application of floor finish. Prior to proceeding with the application of finish, the dry buffing option is to be review with the Owner. If the Owner prefers the dry buffing process then the contractor shall perform the initial dry buffing in lieu of the initial application of floor finish.

3.05 CLEAN UP

- A. Remove from the site and legally dispose of all cartons, rubbish, and debris resulting from the work of this Section.

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09680 - CARPETING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:
 - 1. Carpeting in rooms and spaces designated on drawings.
 - 2. Rubber base as required by the work.
 - 3. Carpet accessories as required by the work.
 - 4. Substrate preparation as required by the work.

1.02 RELATED WORK

- A. Related work specified in other sections of the specifications.
 - 1. Section 09650 - Resilient Floor Tile.

1.03 CONTRACT DOCUMENTS

- A. Applicable provisions of the "Conditions of the Contract" and the General and/or Supplementary Conditions shall govern all work under this section.

1.04 QUALITY ASSURANCE

- A. Installer's Qualifications:
 - 1. A minimum of three years experience.
 - 2. Successfully completed projects of similar magnitude.
- B. Accessibility Requirements:
 - 1. Floor surfaces shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations. These requirements supersede Technical Specifications in this Section.

1.05 SUBMITTALS

- A. Comply with requirements of Section 01300.
- B. Manufacturer's product data, installation and maintenance

instructions for all components of the work.

C. Shop Drawings:

1. Carpeted areas shall include the entire area of the room or space, recesses, closets, and similar areas or as indicated on finish floor plans.
2. Shop drawings shall indicate a working layout for each area showing seam locations, pattern of carpet, colors, trim or edge strips, and other pertinent details.
3. No carpet shall be installed before approvals have been received.

D. Samples:

1. Submit two samples of each of the following for approval:
 - a. Carpet: 12" x 12" each type, pattern, and color.
 - b. Rubber base or other accessories: Manufacturer's standard sample sizes.

E. Certificates: Prior to shipment of materials, submit to the Architect for approval certificates signed by the manufacturer attesting compliance with specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. All carpeting shall be delivered to the job in the original mill wrappings with each roll having its register number properly marked thereon.
- B. Adhesives, solvents, and the like shall be delivered to the job in the manufacturer's original unopened containers, clearly marked.
- C. All materials shall be stored under cover in clean, dry, well ventilated spaces immediately after delivery to the job. Any material which becomes damaged or soiled and, in the opinion of the Architect, cannot be repaired, will be replaced with new specified material at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All carpeting shall be first quality. No "seconds" or "imperfects" shall be installed.
- B. All carpet shall be Class I and shall have minimum critical radiant flux of not less than .45 watts/sq. cm.

- C. All Broadloom carpeting shall be "Constellation-Ecoworx Performance Broadloom" as manufactured by "Shaw Contract Commercial Carpets" or approved equal, of color to be selected by the Architect from the manufacturer's standard line.

Product Type: Performance broadloom
Size: Broadloom 12 foot
Construction: pattern loop
Dye Method: solution & yard dyed
Fiber Product: 100% eco*solution q® nylon - 55% solution dyed/45% space dyed
Protective Treatment(s): SSP® Shaw soil protection
Primary Backing: SYNTHETIC
Secondary Backing: Ecoworx performance broadloom
Gauge: 1/10
Face Weight: 26 oz.
Stitches per inch: 09.83
Finished Pile Thickness: 0.120
Average Density: 7,800 ozs./yd3
Pattern Repeat: 13/32"W X 6 29/32"L
Flammability: ASTM E-648 flooring radiant panel class I, ASTM E-662 NBS smoke chamber less than 450
Electrostatic Propensity: less than 3.5 KV, permanent conductive filament
Warranty: lifetime commercial limited warranty for ecosolution q sd nylon, lifetime commercial limited warranty for Ecoworx performance broadloom backing system
Recommended Installation: full spread Shaw 3500 or Shaw 3600 adhesives
Post Consumer Recycled Content: 0
Post Industrial Recycled Content: 9.7
Green Label Certification #: 59269968
Green Label Plus Certification #: GLP9968

- D. All carpet tile shall be "Constellation-Tile" as manufactured by "Shaw Contract Commercial Carpets" or approved equal, of color to be selected by the Architect from the manufacturer's standard line.

Product Type: carpet tile
Size: 24" x 24"
Construction: loop
Dye Method: solution & yarn dyed
Fiber Product: 55% ECO SOLUTION Q PREMIUM BRANDED NYLON-45% YARN DYED BCF NYLON
Protective Treatment(s): antistatic, SSP® Shaw soil protection, florsept antimicrobial
Primary Backing: SYNTHETIC
Secondary Backing: Ecoworx®
Gauge: 1/10
Face Weight: 24 oz.
Stitches per inch: 09.83
Finished Pile Thickness: 0.099
Average Density: 8,727 ozs./yd3
Pattern Repeat: N/A

Flammability: ASTM E-648 flooring radiant panel class I, ASTM E-662
NBS smoke chamber less than 450
Electrostatic Propensity: less than 3.5 KV, permanent conductive
filament
Warranty: lifetime commercial limited warranty for Ecoworx tile
backing system
Recommended Installation: monolithic
Post Consumer Recycled Content: 0
Post Industrial Recycled Content: 37.4
Green Label Certification #: 59269968
Green Label Plus Certification #: GLP9968

2.02 CARPET ACCESSORIES

A. Rubber Cove or Wall Base

1. Rubber cove or wall base shall be extruded and as manufactured by Roppe Corporation or equal. It shall be constructed of first quality materials, properly vulcanized, and shall be smooth and free from imperfections which detract from its appearance. The base shall conform fully to the requirements of U.S. Federal Specification SS-W-40a, Type I Rubber. All cove base shall be of the straight Style A, with a height of 4" (101.6 mm), in lengths continuous coil (1.22 m), in the color stated (see No. 4 below), and of 1/8" (3.175 mm) thickness.
2. Height: 4"
3. Thickness: 1/8" gauge.
4. Color: as may be detailed in the finish floor plans or as selected by Architect.

B. Rubber Carpet Edge Guard: shall be by Roppe, or equal. Colors as selected by Architect. Provide edge type as follows:

1. Carpet to Vinyl: Roppe #50 tile/carpet joiner or equal.
2. Carpet Termination Reducer: Roppe #38 or #39, or equal. Glue down carpet edge as required.
3. Coordinate with door schedule (if included) and any metal thresholds that may be indicated under that component of the work.

C. Rubber Stair Nosing: Roppe #13 or #14 single flange carpet stair nosing as required or equal.

D. Adhesive: Water-based, water resistant and non-staining as recommended by carpet manufacturer to comply with flammability and VOC requirements for installed carpet.

E. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for use in taping seams and

butting cut edges at backing to form secure seams and to prevent pile loss at seams. Shaw recommends the use of Shaw 3500 or 3600 (AATCC174) adhesives or equivalent adhesives, which have been formulated with a higher solids content and will perform adequately with the Eco Broadloom backings.

- F. Leveling and Patching Compounds: Types as recommended by carpet manufacturer and as appropriate for compatibility with substrate.

2.03 OTHER ACCEPTABLE MANUFACTURERS

- A. Collins and Aikman
- B. Bentley/Prince Street
- C. Interface
- D. An equal approved by the Architect

PART 3 - EXECUTION

3.01 PREPARATION AND SUBFLOOR CONDITIONS

- A. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
 - 1. Dimensions supplied in these specifications and drawings are approximate. The Contractor shall carefully check dimensions and other conditions affecting his work in the field and shall be responsible for proper installation of carpet in areas designated.
 - 2. Surfaces to receive carpet shall be thoroughly clean, smooth, free from irregularities, and dry; apply sealer recommended by carpet manufacturer to prevent dusting if required.
 - 3. Contractor shall prepare floors to receive new flooring by washing, etching, sanding, or filling or other procedures as necessary for satisfactory installation.
- B. Subfloor Moisture Conditions: Moisture emission rate of not more than 5 lbs./1000 sq.ft./24 hours where tested by anhydrous calcium chloride moisture test in compliance with CRI 104, with subfloor temperatures not less than 55°F.
 - 1. Contractor shall include in the base bid additional costs for any additional surface preparation work and materials required to install carpet relative to specific slab-moisture

content.

- C. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHDrion paper is applied.
- D. Apply latex underlayment where required to correct subfloor. Fill concrete slab on grade control joints with latex or as recommended by manufacturer for proper substrate. Underlayment shall be steel troweled smooth to prevent marks showing through installed carpet. Substrate imperfections telegraphing through installed carpet will not be acceptable and shall be reason to remove.
- E. Concrete floors must be sealed if dusting or powdering exists. **Do not use sweeping compounds as they may leave oily deposits.** The following floor sealers are suggested for concrete. Coordinate with manufacturers requirements for materials selected.
 - 1. Shaw Contract 9050 Floor Sealer and Shaw 8550 Level Primer.
 - 2. Kure-N-Seal-Sonneborn #0800 - Chemrex, Inc.
 - 3. Spartan Cote Cure Seal Hardener - The Burke Group.

3.02 INSTALLATION

- A. Carpeting shall be installed in accordance with the manufacturer's instructions and the best methods of the trade.
- B. All surfaces to receive carpet shall be level, smooth, clean, and dry, in a finished condition suitable to receive carpet. The carpet contractor shall notify the Owner in writing of any and all conditions to the contrary or otherwise unsatisfactory. In an instance where the flooring Contractor is the Prime Contractor, this Contractor shall be responsible for all floor preparation unless otherwise indicated. The installation of carpet shall be an indication of his acceptance of the existing conditions. No carpet shall be installed before approval.
- C. Broadloom carpet shall be installed with adhesive applied directly to the sub-floor. Where seams occur in carpeting, they shall be seam sealed and latex reinforced with a lifetime edge ravel warranty. Where edge of carpeting butts other flooring material, the edges shall be protected with rubber edge strip unless aluminum thresholds are otherwise indicated. Edging shall be anchored to concrete floors with adhesive.
 - 1. Fit sections of carpet prior to application of adhesive. Trim edges and butt caps with seaming cement.
 - 2. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt edges tight to form seams without gaps. Roll entire area lightly to eliminate air pockets and ensure uniform bond. All seams on vinyl backed carpet are to be chemically welded.

3. All patterned carpet shall have pattern aligned at seams.
- D. Carpet tile shall be installed with pressure sensitive adhesive such as Shaw Contract 5000, 5100 or equal. A 3/8" foam paint roller may be used to apply the adhesive. Allow the adhesive sufficient open time so that it will not transfer to the back of the tile. **The adhesive must be allowed to dry completely before installing the carpet.** Installing into wet adhesive will result in a permanent bond and may cause carpet to bubble. **NOTE - A FULL SPREAD OF ADHESIVE IS REQUIRED.**
- E. Roll entire installation with a 75# roller at completion.
- F. On completion of installation, dirt, carpet scraps etc., must be removed from the surface of the carpet. The carpet must be cleaned with a beater type vacuum cleaner. Soiled spots or adhesive on the carpet shall be removed with the proper spot remove. Loose pieces of face yarn must be removed with sharp scissors.
- G. Use plywood over the carpet when heavy objects are moved within 24 hours after installation. A non-staining building material paper must be placed over the carpet to protect it when additional construction activity is to take place that would soil or stain it. **Do not use plastic sheeting as it will trap moisture.**

3.03 MAINTENANCE

- A. The carpet manufacturer shall conduct a maintenance seminar for Owner's personnel.
- B. Include a maintenance schedule and a list of necessary equipment required to maintain carpet.

3.04 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below packaged with protective covering for storage and identified with labels describing contents.
1. Carpet & Carpet Tile: Furnish quantity of material, in full width roll, equal to 2 percent of the amount of each carpet type installed, but not less than 100 sq. ft.

3.05 WARRANTY

- A. Manufacturer must guarantee the following:
1. Abrasive Wear: Warrant that the carpet will lose no more than 10 percent by weight of pile face fiber during the lifetime warranty period when installed and maintained in accordance with manufacturer's procedures.

2. Static Protection: Warrant that the carpet will not generate static build-up in excess of 3.5KV during the lifetime warranty period as tested by AATCC test method 134.
 3. Backing Integrity Delamination: Warrant that the secondary backing of the carpet will not delaminate from the face carpet for lifetime warranty period. Chair pads are not required whether the carpet is installed direct to the floor or by conventional tackless installation over cushion.
 4. Edge Ravel: Warrant that under normal use the carpet will not edge ravel at seams or edge for the lifetime warranty period.
 5. Tuft Bind: Warrant that the carpet will have an average face yard tuft bind of 20 pounds for the lifetime warranty period when tested using the ASTM D-1335-67 method. This portion of the warranty must protect against insufficient tuft bind, whether the carpet is dry or wet (as it might be during steam cleaning, hot water extraction, or as a result of a broken pipe or flood).
 6. Pattern matching of seams (Broadloom only): Warrant that under normal use the carpet will pattern match within acceptable industry standards. Regardless of pattern repeat size, when installed in accordance with manufacturer installation guidelines.
 7. Moisture Management (Broadloom Only): Warrant that under normal use, the carpet will keep liquid spills above the pre-coat layer for a minimum of 24 hours as tested under the British Spill Method; Part 2.
- B. Warranty shall be from the manufacturer, written specifically for the project.

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 DESCRIPTION

- A. Work included: Paint and finish all new and existing interior and exterior wall surfaces related with proposed work area and all new and existing steel structures specified on drawings.
 - 1. Examine the specifications and drawings of all trades and thoroughly be familiar with all provisions regarding painted work included therein. Surfaces shown, noted, scheduled, or specified to receive painters' finish as part of the work of this section.
 - 2. The painting subcontractor shall furnish, maintain, and remove when no longer required, all scaffolding, staging, and riggings required for this work.

1.03 RELATED WORK DESCRIBED ELSEWHERE

- A. Shop Coats: Refer to specific project manual sections for shop coats on items such as structural steel, miscellaneous metal, custom hollow metal work, and similar items.
- B. Pre-Finished Items: Refer to specific project manual sections for factory-finished, or installer finishes.

1.04 WORK NOT INCLUDED

- A. Do not include painting, which is specified under other sections.
- B. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.
- C. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this section except as may be specified herein.
- D. Do not paint any moving parts of operating units, mechanical or electrical parts such as valve operators, linkages, sinkages, sensing devices, and motor shafts, unless otherwise indicated.
- E. Do not paint over any required labels or equipment identification, performance rating, name or nomenclature plates.

1.05 DEFINITIONS

- A. The term "paint," as used herein, means all coating systems materials including primers, emulsions, epoxy, enamels, stains, sealers, fillers, and other applied materials where used as prime, intermediate, or finish coats.

1.06 QUALITY ASSURANCE

- A. Standards: Comply with standards specified in the section and as listed in Section 01085.
- B. Qualifications of Manufacturers: Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Architect.
- C. Qualifications of Applicators:
 - 1. Provide at least one person who shall be present at all times during execution of the work of this section, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all work performed under this section.
 - 2. Provide adequate numbers of workman skilled in the necessary crafts and properly informed of the methods and materials to be used.
 - 3. Minimum three years of experience in applying commercial coating systems similar to the materials specified.
- D. Paint Coordination:
 - 1. Provide finish coats, which are compatible with the prime coats used.
 - 2. Review other sections of this specification as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
 - 3. Upon request, furnish information on the characteristics of the specific finish materials to ensure that compatible prime coats are used.
 - 4. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.
 - 5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coating supplied under other sections.

E. Field Samples:

1. Before proceeding with paint application, finish one complete surface of each color scheme required, clearly indicating selected colors, finish texture, materials, and workmanship.
2. Sample areas, when accepted by the Architect, shall serve as a minimum standard for work throughout the entire project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title.
2. Product description (generic classification or binder type).
3. Federal Specification Number, if applicable.
4. Manufacturer's stock number and date of manufacture.
5. Contents by volume, for pigment and vehicle constituents.
6. Thinning instructions.
7. Application and instructions.
8. Color name and number.

B. Storage:

1. Provide proper storage to prevent damage to, and deterioration of, paint materials.
2. Store all materials in a single location approved by the Architect. Storage area is to be kept neat and clean. Any damage to the storage area or surrounding occurring during its use for storage shall be repaired to its original state (Architect's acceptance required). Remove all soiled or used rags, waste, and trash from the building every night and take every precaution to avoid damage of fire.

C. Protection:

1. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of other trades.

D. Replacement:

1. In the event of damage, immediately make all the repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.08 JOB CONDITIONS

- A. Provide continuous heating and ventilation as required to maintain surface and ambient temperatures above 50°F for at least 24 hours before, during and for at least 48 hours after paint application.
- B. Do not apply paint in snow, rain, fog, or mist, or when relative humidity exceeds paint manufacturer's recommended limits. Avoid painting surfaces while they are exposed to hot sun.
- C. Lighting: Provide minimum 80 foot candle light level at mid-height of substrate surface.

1.09 EXTRA STOCK

- A. Amount: Upon completion of the work of this section, deliver to the Owner an extra stock equaling 10% of each color, type, and gloss of paint used on the work.
- B. Packaging: Tightly seal each container and clearly label with the contents and location used.

1.10 SUBMISSIONS

- A. General: Comply with requirements of Section 01300 and as modified bellow.
- B. Product Data:
 1. Submit to the Architect a complete schedule of paint materials proposed to be furnished and installed under this section, including name of manufacturer and type of paint.
 2. Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.
 3. For information only, submit two copies of manufacturer's specifications, including paint analysis and application instructions for each material. Indicate by transmittal that a copy of each manufacturer's instructions has been distributed to the applicator.
- C. Samples: Submit three (3) 8 ½" x 11" paint strike offs of each paint color and paint type specified for color match verification. Identify each sample as to finish, formula, color name, and color number.
- D. Stain Samples: Submit three (3) 8 ½" x 10" wood samples of stain matching specified wood species and color for architect's approval.

- E. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

PART 2 - PRODUCTS

2.01 PAINT MATERIALS

- A. Design is based on the use of paint products manufactured by Benjamin Moore and the materials of that manufacturer are named in the painting schedule. Equal products of other manufacturers approved in advance by the Architect may be utilized.
- B. General: Provide the best quality grade of the various types of coatings as regularly manufactured by paint materials manufacturers approved by the Architect. Materials not displaying the manufacturer's identification as a standard best-grade product will not be acceptable.
- C. Durability: Provide paints of durable and washable quality. Do not use paint materials, which will not withstand normal washing, as required to remove pencil marks, ink, ordinary soil, and similar material without showing discoloration, loss of gloss, staining or other damage.
- D. Colors and Glosses: Provide colors and glosses to match existing from manufacturer's full range of colors for each product indicated.
- E. Undercoats and Thinners: Provide undercoat paint produced by the same manufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer, and use only the recommended limits. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.
- F. Standards: Provide paint materials which meet or exceed the standards listed for each application in the Painting Schedule in Part 3 of this section.
 - 1. All paint to be V.O.C. compliant.
- G. Application Equipment: For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint and as approved by the Architect.
- H. Other Materials: All other materials, not specifically described but required for a complete and proper installation of the work of this section, shall be new, first-quality of their respective kinds, and as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Prior to installation of the work of this section, carefully inspect the installed work of all other trades and verify that such work is complete to the point where this installation may properly commence. Verify that painting may be completed in strict accordance with the original design and with the manufacturer's recommendations as approved by the Architect.

3.02 DISCREPANCIES

- A. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.
 - 1. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.

3.03 MATERIALS PREPARATION

- A. General
 - 1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's requirements and application instructions as approved by the Architect.
 - 2. Remove all removable items, which are in place and are not scheduled to receive paint finish, or provide surface-applied protection prior to surface preparation and painting operations.
 - 3. Following completion of painting in each space or area, reinstall the removed items by using workmen skilled in the necessary trades.
 - 4. Clean each surface to be painted prior to applying paint or surface treatment.
 - 5. Remove oil and grease with clean cloths and cleaning solvents of low toxicity and a flash point in excess of 38°C (100°F), prior to start of mechanical cleaning.
 - 6. Schedule the cleaning and painting in coordination with the Owner.
- B. Preparation of Metal Surfaces: Clean non-galvanized, ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.
 - 1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush; clean with solvents recommended by the paint manufacturer, and touch-up with same primer as the shop coat.
3. On galvanized steel, aluminum and other non-ferrous metals: clean bare metals with oil and grease emulsifier in accordance with manufacturer's instructions. BM Corotech V600 or XIM GON-20 Prep Cleaner or equal.
4. Allow to dry thoroughly before application of paint.

3.04 STAIN APPLICATION

- A. Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of priming coat. After priming fill holes and imperfections in finished surfaces with putty or plastic wood filler. Sandpaper smooth when dried.
- B. Stain or seal wood required to be painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases and paneling.
- C. When transparent finish is required, use spar varnish for back priming.
- D. Back-prime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.
- E. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

3.05 PAINT APPLICATIONS

- A. General
 1. Apply products in accordance with manufacturer's instructions.
 2. Secure color schedules before applying paint or finish. Tint primer and undercoat to the approximate shade of the finish coat.
 3. Apply all materials under adequate illumination and as follows:
 - a. Brush Application: Brush out and work all brush coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

b. Spray Application:

1. Confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.
2. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building of film thickness of two coats in one pass.
4. Allow sufficient drying time between coats. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.
5. Apply materials in sufficient quantity to insure complete coverage and hide. Provide and apply additional coats until paint film is uniform in finish, color, appearance, and coverage.

B. Cleaning:

1. Promptly remove spilled, splashed, or splattered paint on finish as work proceeds and upon completion.
2. Keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris during progress of work.
3. Upon completion of work, leave premises in neat and clean condition.

- C. Completed work shall match the approved samples for color, texture, and coverage. Remove, refinish, or repaint all work not in compliance with specified requirements.

3.06 PAINTING SCHEDULE

- A. General: Painting required under this section is called for on the drawings. Paint types for specific surfaces, exterior and interior are as defined below:

<u>Exterior Work</u>			
<u>Surface</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
Hollow Metal Doors & Frames (Note 3 & 4)	B or *	A	A
Exposed Miscellaneous Metal or Structural Steel (Note 3 & 4)	T or *	I	I
Steel Handrails & Steel Lintels (Note 3 & 4)	T	I	I
Traffic Bearing Exterior Metals (Steel Ladders - Foot Traffic) (Note 3 & 4)	N	R	R
Aluminum (Note 4)	B	A	A
Wood, Visible Blocking, Plywood	C	D	D
Visible Metal Plaster accessories adjoining stucco	T	I	I
Concrete Block	E	F	F
Galvanized Metal (Note 4)	B	I	I
Concrete Walls	O	F	F

Interior Work			
Surface	1st Coat	2nd Coat	3rd Coat
Concrete Block	E	G	G
Plaster	M	G	G
Gypsum Drywall	M	G	G
Concrete Walls	O	G	G
Concrete Floors (Note 1 & 5)	N	Q	Q
Concrete Floors (High Vehicle Traffic, Wet Environments) (Note 1)	N	U	R
Wood-Painted (Note 2)	H	G	G
Wood-Natural Finish	J	J	J
Wood-Stained Finish	S	J	J
Hollow Metal, Steel Handrails & Steel Stair Components (Note 3 & 4)	B or *	A	A
Exposed Structural Steel & Steel Joists (Note 3 & 4)	B or *	K or L	K or L
Galvanized Steel Floor or Roof Deck (Note 4)	B	K or L	K or L
Miscellaneous Metal (Note 3 & 4)	B or *	L	L
Steel Floor Deck (Diamond Plate etc.) (Note 3 & 4)	N	R	R
Galvanized Metal (Note 3 & 4)	B	A	A
Exposed Ductwork (Note 4)	B	K or L	K or L

*Shop Coat - See other sections of Project Manual

Note 1: Where non-skid properties are required, a non-skid additive shall be used. Apply per manufacturer's instructions. Confirm if required via Architect.

Note 2: This is for large exposed surfaces. Where paint is indicated on narrow recesses, or on visible surface of back-up supports or blocking, use flat enamel.

Note 3: Inspect shop coat and touch up prior to finish coat application to prevent finish coat contacting bare steel. All exposed structural steel is to be painted in finished areas as per schedule unless noted otherwise on the Contract Documents.

Note 4: Prior to priming and painting of exposed ductwork, galvanized steel, aluminum and other non-ferrous metals the Contractor shall clean bare metal with an oil and grease emulsifier (Moore's Corotech V600 or XIM GON-20 Prep Cleaner or equal). This product shall be ready to apply from the container. Careful surface preparation and cleaning is required. All surfaces shall be thoroughly clean and free from all grease, wax, oil, polish, loose paint, dirt or rust. Do not use mineral spirits, turpentine solvent or cleaners which will leave an oily residue. Apply clean and remove/rinse in accordance with manufacturer's instructions.

Note 5: For concrete floors V155 (TYPEN) is 1st coat for V410. If Type N122 is chosen 1st coat is a thin coat of N122

3.07 KEY TO PAINTS

* Shop coat: See other section of Project Manual.

A	Moore's Corotech Acrylic DTM Enamel Semi-Gloss V331
B	Moore's Corotech Acrylic Metal Primer V110
C	Moore's Fresh Start Exterior Oil Primer 094
D	Moore's Ultra Spec EXT Low Lustre Finish N455
E	Moore's Ultra Spec Masonry Int/Ext Hi-Build Block Filler 571 or Moore's Blockfiller 244.
F	Moore's Ultra Spec EXT Gloss N449
G	Moore's Ultra Spec 500 Interior Latex Gloss N540 (traditional semi-gloss) or BM Ultra Spec 500 Interior Latex Eggshell N538 (Item "G" gloss shall be determined by this Architect)
H	Moore's Fresh Start Multi-Purpose Oil-Based Primer 024
I	Moore's Super Spec HP Urethane Alkyd Gloss Enamel P22
J	Moore's Benwood Stays Clear Acrylic Polyurethane Low Lustre N423
K	Moore's Latex Dry Fall Flat 395
L	Moore's Ultra Spec 500 Interior Acrylic Flat N536
M	Moore's Fresh Start Multi-Purpose Latex Primer 023
N	Moore's Corotech 100% Solid Epoxy Pre-Primer V155
O	Moore's Ultra Spec Masonry Int/Ext 100% Acrylic Masonry Sealer 608
P	NOT USED
Q	Moore's Latex Floor & Patio Enamel Low Sheen N122, <u>or</u> BM Corotech Fast Dry Polyamide Epoxy V410 (Item "Q" shall be as determined by this Architect).
R	Moore' Corotech Aliphatic Acrylic Urethane Semi-Gloss V510
S	Moore's Lenmar Waterborne Interior Wiping Stain 1WB.1300
T	Moore's Super Spec HP Alkyd Metal Primer P06
U	Moore's Corotech 100% Solids Epoxy Floor Coating V430

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10500 - CORRIDOR LOCKERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.

1.02 SCOPE

- A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:
 - 1. Lockers where shown on the drawings.
 - 2. Metal closures, trim, and accessories where required.
 - 3. Locking mechanism and locking devices for all lockers.
 - 4. Wood furring and/or wood blocking.

1.03 GENERAL PROVISIONS

- A. Delivering and Handling: Deliver all materials in unopened original containers bearing manufacturer's labels. Handle all materials with proper care to prevent damage.
- B. Cleaning: At all times during the progress of the work, keep all parts clean and remove all rubbish and debris caused by the work of this section and leave the entire installation in presentable and orderly condition.
- C. Defective Work: All defective, damaged, defaced, or other work of substandard quality will be rejected by the Architect and replaced with new work in accordance with the specifications, without extra cost to the Owner.
- D. Warranty: Lockers are covered against all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction and vandalism under this section **for a period of two years.**

1.04 SHOP DRAWINGS

- A. Submit complete and accurate shop drawings, details, or illustrated literature to the Architect for approval, in strict accordance with applicable requirements of the contract documents.
 - 1. Shop drawings: submit drawings showing locker types, sizes, and quantities, including the necessary details relating to anchoring, trim installation and relationships to adjacent surfaces.

2. Numbering: Locker numbering sequence shall be coordinated with Owner.
3. Color charts: Submit color charts showing manufacturer's available colors.
4. Locker combination listing and master keys: Coordinate and deliver with the Owner.
5. No installation shall be made without prior approval of the Architect.

1.05 MEASUREMENTS / CONDITIONS

- A. Take and verify all measurements required for the proper execution and fit of the work at the building before starting fabrication or erection and examine the nature of material to which the work of this section will be attached.
- B. Do not deliver / install lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage, and installation.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with the design, material, method of fabrication and installation as required in this specification section or modified as shown on drawings. Manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. Art Metal Products (Basis of Design)
 2. A.S.I
 3. Lyon

2.02 LOCKERS

- A. Corridor Locker Style: Heavy Duty Corridor Elite - K.D.
- B. Configuration: Single Tier
- C. Column Size: 8"w x 12"d x 72"
- D. Lock Type: Master 1525 - Pad Lock
- E. Color: Frame and Body as selected by Architect
- F. Number of Locker Columns: Coordinate with floor plans
- G. Number of Locker Openings: Coordinate with floor plans.
- H. 5% of total locker quantity shall be ADA compliant and evenly dispersed between all floors.

2.03 FABRICATION

- A. General: Fabricate lockers square, rigid and without warp, with metal faces flat and free from dents or distortion. Make all exposed metaledges safe to touch. Weld frame members together to form rigid, one-piece structure. Weld, bolt, or rivet other joints and connections as standard with manufacturer. Grind exposed welds flush. Do not expose bolts or rivet heads on fronts of locker doors or frames.
- B. Finishing: All locker parts to be cleaned and coated after fabrication with a seven stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade enamel electrostatically sprayed and baked at 325°F for a minimum of 30 minutes to provide a tough durable finish. Color to be selected from manufacturer's standard list of colors.
- C. Frame: Fabricate of 16 gauge (minimum) channels, with integral continuous door stop/strike formed on both latch and hinge side vertical members. Cross frame members of 16 gauge channel shapes, including intermediate cross frame members on double and triple tier (frames with doors over 18" high) lockers shall be securely welded to the vertical framing members to ensure rigidity. Rubber bumpers shall be provided to cushion door closing.
- D. Wardrobe Doors: Outer door to be fabricated from single sheet prime 14 gauge with single bends at top and bottom and double bends at the sides with a 3" wide 18 gauge full height channel door stiffener spot welded to the inside of door face and MIG welded to the hinge side of the door as well as to the top and bottom door return bends to form a rigid torque-free box reinforcement for the door. Door Style: Secure air flow louver.
- E. Stainless Steel Recessed Locker Handle: All locker doors shall have a stainless steel recessed handle shaped to receive a padlock or built-in combination lock. The recess pan shall be deep enough to have the lock be completely flush with the outer door face. A finger lift/padlock hasp shall protrude through the top of the handle for easy opening of the locker door.
- F. Latch Assembly: The latching mechanism for wardrobe doors shall be finger lift control type constructed of 12 gauge (minimum) steel with a nylon cover that has a generous finger pull. Spring activated nylon slide latches shall be completely enclosed in the lock channel allowing doors to close with the lock in the locked position. Locking device shall be designed for use with either built-in combination locks or padlocks. Latch hooks shall be securely riveted to the vertical frame channel on the strike side to engage the nylon slide latches. Three latch hooks for doors 48" and higher, two latch hooks for doors under 48" high.
- G. Door Hinges: Hinges for wardrobe doors shall not be less than 16 gauge continuous piano type, securely riveted to frame and welded to the door. All doors shall be right hand side hinged.

H. Body: Fabricate back and sides of 24 gauge (minimum) sheet steel, (back & starter sides shall be solid with no perforations) with double flanged connections extending full height. Form top, bottom and intermediate tier dividers of 16 gauge (minimum) sheet steel with single return bends at all sides. Bolt top and bottom as well as horizontal tier dividers to front horizontal frame members at no less than two places in addition to side panels. Form hat shelves at 60" and 72" high single tier lockers of 16 gauge (minimum) sheet steel with single bends at sides and back and a double bend at front.

I. Locker Accessories

~~1. Wardrobe Lockers: Combination built-in locks with 5 master keys.~~

2. Equipment: Furnish each locker with the following items, unless otherwise shown.

a. Single tier lockers: Shall include one shelf, two double prong wall hooks.

3. Fillers: Provide where indicated and/or required, of not less than 16 gauge sheet steel, factory fabricated and finished to match lockers.

J. Number Plates: Each locker shall have a polished aluminum number plate with black numerals not less than ½" high. Plates shall be attached with rivets to the lower surface within the recessed handle pocket.

K. Freestanding Lockers:

1. Unless otherwise noted below, freestanding lockers (designated as MB on the drawings) shall match fabrication descriptions specified herein.

2. 4" Continuous Z-Base: Shall be fabricated from 16 gauge cold rolled sheet steel fabricated in 72" lengths, flanged at the top to form a 1-3/8" toe space and at the bottom allowing concealed fastening to the finished floor. Continuous Front Bases include holes for use with splice plates where bases are joined end-to-end. End Bases are to be included at all exposed ends. Where additional support is desired, End Bases may be substituted for splices at Continuous Front Base joints. Finish to match lockers.

3. Boxed End Panels: Shall be "Boxed" type formed from 16 gauge cold rolled steel with 1" O.D. double bends on sides and a single bend at top and bottom with no exposed holes or bolts. If lockers have slope tops, end panels must be formed with slope at top to cover the ends of the slope tops. Finish to match lockers. Provide at all exposed ends.

4. 16 Gauge Continuous Slope Tops: Not less than 16 gauge cold rolled sheet steel, 18 degree pitch, in 72" lengths. A splice cover with concealed spring clip is to be used to cover joints where Continuous Slope Tops are joined end-to-end. To be installed in addition to the locker flat top with end closures for support. Finish to match lockers

- L. Assembly: Assembly of all locker components shall be accomplished by the use of zinc plated, low round head, slot less, fin neck machine screws with keps nuts, producing a strong mechanical connection.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Lockers must be installed in accordance with manufacturer's approved drawings and assembly instructions. Installation to be level and plumb with flush surfaces and rigid attachment to anchoring surfaces.
- B. Space fasteners at 12" O.C. Use fasteners appropriate to load and anchoring substratum. Use reinforcing plates wherever fasteners could distort metal.
- C. Various trim accessories where shown such as sloping tops, fillers, bases, recess trim, etc., shall be installed using concealed fasteners. Flush, hairline joints shall be provided at all abutting trim parts and at adjoining surfaces.

3.02 ADJUSTMENT

- A. Upon completion of installation, inspect lockers and adjust as necessary for proper door and locking mechanism operation. Touch up scratches and abrasions with factory-supplied paint to match original finish.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10501 - FULLY-WELDED ATHLETIC LOCKERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.

1.02 SCOPE

- A. Provide all labor, materials, equipment, and services and perform all operations required to complete the installation of all work of this section and related work as indicated on the drawings and specified herein, including, but not necessarily limited to, the following:
 - 1. Heavy Duty, Ventilated Athletic Lockers where shown on the drawings or as may be required.
 - 2. All required accessories, metal closures, trim where shown on the drawings or as may be required.
 - 3. Locking mechanism and locking devices for all lockers.
 - 4. Wood furring, blocking or trim as may be required by drawings or the manufacturer for the complete and proper installation of the lockers and accessories shall be included with these installation.

1.03 GENERAL PROVISIONS

- A. Delivering and Handling: Deliver all materials in unopened original containers bearing manufacturer's labels. Handle all materials with proper care to prevent damage.
- B. Cleaning: At all times during the progress of the work, keep all parts clean and remove all rubbish and debris caused by the work of this section and leave the entire installation in presentable and orderly condition.
- C. Defective Work: All defective, damaged, defaced, or other work of substandard quality will be rejected by the Architect and replaced with new work in accordance with the specifications, without extra cost to the Owner.
- D. Warranty: Lockers are covered against all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction and vandalism under this section **for the lifetime of the facility.**

1.04 SHOP DRAWINGS

- A. Submit complete and accurate shop drawings, details, or illustrated literature to the Architect for approval, in strict accordance with applicable requirements of the contract documents.
- B. No installation shall be made without prior approval of the Architect.
- C. Shop Drawings shall show locker types, sizes and quantities, including all necessary details relating to anchoring, trim installation and relationship to adjacent surfaces.
- D. Numbering: The locker numbering sequence shall be provided by the Architect on the manufacturer's submitted shop drawings, and shall be clearly noted on the approved drawings returned to the locker contractor.
- E. Color Charts: Provide color charts showing manufacturer's available colors. Submit samples of paint on metal for all color selections.
- F. Lock Combination Listings and Master Keys: Use only when combination locks are specified. These shall be delivered directly to the Owner's Representative.

1.05 MEASUREMENTS

- A. Take and verify all measurements required for the proper execution and fit of the work at the building before starting fabrication or erection and examine the nature of material to which the work of this section will be attached.

1.06 QUALITY ASSURANCE

- A. Uniformity: Provide each type of metal locker as produced by a single manufacturer, including necessary accessories, fittings and fasteners.

1.07 JOB CONDITIONS

- A. Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage and installation.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Available manufacturers: Provide all lockers and related accessories through one source from a single manufacturer. Subject to compliance with the design, material, method of fabrication and installation as required in this specification section or modified as shown on the drawings, the following manufacturers' products are acceptable:
1. Art Metal Products (Basis of Design) - AMP - 1004 Bulldog twin frame all welded athletic locker.
 2. A.S.I
 3. Lyon

2.02 LOCKERS

- A. Athletic Locker Style: Bulldog
- B. Configuration: Single Tier, Double Tier & Triple Tier
- C. Column Size: Coordinate with Construction Documents
- D. Lock Type: Master 1525 - Pad Lock
- E. Color: Frame & Body as selected by Architect
- F. Number of Locker Columns: Coordinate with Construction Documents
- G. Number of Locker Openings: Coordinate with Construction Documents

2.03 FABRICATION

- A. General: All lockers shall be factory-assembled, of all MIG welded construction, in multiple column units to meet job conditions. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable.
- B. Finish: All locker parts to be cleaned and coated after fabrication with a seven stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade enamel electrostatically sprayed and baked at 325°F for a minimum of 30 minutes to provide a tough durable finish. Color to be selected from manufacturer's standard list of colors.
- C. Twin Frame/Vertical Side Panels: Shall be of integral frame and side wall construction manufactured from 16 gauge sheet steel. The one-piece side/frame shall be formed to provide a continuous door strike on the hinge side. An additional continuous vertical door strike shall be achieved at the latch side by MIG welding a 16

gauge full height channel frame member to the integral locker side producing a rigid torque-free welded locker body. The frame shall include a tab which engages a slot in the base locking the side panel and frame into position. Sides to be solid.

- D. Wardrobe Door: Outer door to be fabricated from single sheet prime 14-gauge with single bends at top and bottom and double bends at the sides with a **3 ½"** wide 18-gauge full height channel door stiffener spot welded to the inside of door face and MIG welded to the hinge side of the door as well as to the top and bottom door return bends to form a rigid torque-free box reinforcement for the door. All doors shall be right hand side hinged. Door Style: Secure air flow louver.
- E. Seamless Drawn Stainless Steel Recessed Locker Handle: All locker doors shall have a seamless drawn stainless steel recessed handle shaped to receive a padlock or built-in combination lock. The recess pan shall be deep enough to have the lock be completely flush with the outer door face. The pull handle shall be drawn into the left side of the handle for easy opening of the locker door.
- F. Latch Assembly: Shall be single point rigid non-moving positive latch by means of a heavy 11-gauge (minimum) latch securely welded to the 16 gauge vertical frame member at both the continuous door strike as well as the integral locker side to prevent the latch and frame from twisting. The latch assembly must be through the recess pan. The latch must be able to accept either a padlock or built-in combination lock. A pry resistant lug which inserts into the door shall be an integral part of the 11 gauge latch. Rubber bumpers shall be securely attached to the door strike.
- G. Door Hinges: Hinges for wardrobe and gym doors shall not be less than 16 gauge continuous piano type, securely riveted to frame and welded to the door. All doors shall be right hand side hinged.
- H. Hat Shelves Intermediate Shelves & Bottoms: Shall be 16 gauge sheet steel, have double bends at front and shall have MIG welded to the side.
- I. Backs: Shall be 18 gauge cold rolled sheet steel, be continuous to cover a multiple framed unit and be welded to each vertical side panel.
- J. Locker Accessories
 - 1. Locks: Master 1525 - Pad Lock
 - 2. Finished End Panels: Shall be "boxed" type formed from 16 gauge cold rolled steel with 1" O.D. double bends on sides and a single bend at top and bottom with no exposed holes or bolts. Lockers with slope tops will have end panels formed with slope at top to cover the ends of the slope tops. Finish to match lockers. Provide at all exposed ends.

3. Fillers: Provide where indicated, of not less than 16 gauge sheet steel, factory fabricated and finished to match lockers.
4. Sloped Tops: Lockers for this project shall have sloped tops, 16 gauge sheet steel, factory fabricated & finished to match lockers.
5. Solid End Panels at Corners and Filler Locations: Install solid sheet steel side panels to locker sides at corners and beside front filler locations to prevent personal articles from being trapped in void at these locations.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be made by the manufacturer or a licensed representative approved by the Architect. Lockers must be installed in accordance with manufacturer's approved drawings and assembly instructions. Installation to be level and plumb with flush surfaces and rigid attachment to anchoring surfaces. Space fasteners at 36" O.C. or less as recommended by manufacturer. Use fasteners appropriate to load and anchoring substratum. Use reinforcing plates wherever fasteners could distort metal.
- B. Various trim accessories where shown such as sloping tops, fillers, bases, recess trim, etc., shall be installed using concealed fasteners. Flush, hairline joints shall be provided at all abutting trim parts and at adjoining surfaces.
- C. All work is to be executed by skilled mechanics and shall be of the finest quality, neat in appearance and free from defects.
- D. Lockers shall be anchored at each bank end and 12" o.c. at two points.
- E. Locker Contractor shall inspect all substrate conditions prior to starting installations. The Contractor shall install all required sleepers and/or blocking as conditions require for the complete and positive attachment to existing substrates.

3.02 ADJUSTMENTS

- A. Upon completion of installation, inspect all lockers and adjust as necessary for proper door and locking mechanism operation. Touch up scratches and abrasions with factory-supplied paint to match original finish.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10601 - POLYMER TOILET PARTITIONS

PART 1 - GENERAL

1.01 SCOPE

- A. Requirements of the General Conditions and Special Conditions apply to the work in this section.
- B. Provide all labor, materials, etc. necessary for the completion of the work of this section as specified or shown on the drawings.
- C. Work of this section consists of, but is not limited to, the following:
 - 1. Provision and installation of toilet stalls, stall doors, urinal screens, privacy screens, restroom entry partitions and shower partitions.
 - 2. Hardware, etc. for stalls & partitions.
 - 3. Shop drawings.
 - 4. Labor and Material Guarantee per General Conditions and provide 15 year manufacturer's material guarantee to the Architect for approval with Contractor's Final Application for Payment.

1.02 SUBMITTALS

- A. All submittals shall be in accordance with Section 01300 - Submissions.
- B. Submit manufacturer's product data and shop drawings, including details and a sample of each item of hardware for Architect's approval.
- C. Provide drawings showing locations for adequate steel reinforcements of wood blocking in walls to be provided for proper securement of the finished work.
- D. Furnish physical samples and/or color cards for the use of the Architect. Selection of colors shall be from all Color Collections including but not limited to: Classic, Metallic, Mosaic & Designer and in all Texture options, as selected and approved by the Architect.
- E. Provide manufacturer's recommended maintenance procedures.

PART 2 - MATERIALS

2.01 GENERAL

- A. Toilet partitions, privacy screens and restroom entry partitions shall be floor mounted, overhead braced, with non-corrosive panels, doors, pilasters, shoes, and wall brackets similar and equal to 1"

thick high density polyethylene resin partitions as manufactured by Scranton Products, ASI Global Partitions or comparable products with hardware as specified herein.

- B. Panels, doors, pilasters, shoes, and wall brackets shall be fabricated from Polymer resins under high pressure forming a single component section which is waterproof, nonabsorbent, and has self-lubricating surface that resists marking with pens, pencils, or other writing utensils. All panels, doors, and pilasters to arrive at job site with special protective plastic coating.

C. Construction:

1. Single component construction of solid HDPE in colors that extend from the surface throughout the entire thickness of the panels, doors, and pilasters.
2. Doors, panels, and pilasters shall be 1-inch thick and all edges machined to a radius of .250 inch and all exposed edges to be free of saw marks.
3. Dividing panels shall be 55 inches high and mounted at 14 inches above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all panels full length. Panel at the end of layout shall extend up and fasten into headrail.
4. Doors shall be 55 inches high and mounted at 14 inches above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all doors full width.
5. Pilasters shall be 82 inches high and fastened to 3 inch high Type 304 20 gauge stainless steel shoes with one-way stainless steel theft proof torx head sex bolts.
6. Finish of doors, panels, and pilasters shall be similar or equal to Scranton Products "Plastic-Glaze 280."

D. Performance Requirements:

1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
 - a. Smoke Developed Index: Not to exceed 450
 - b. Flame Spread Index: Not to exceed 75
 - c. Material Fire Ratings:
 1. National Fire Protection Association (NFPA): Class B
 2. International Code Council (ICC): Class B

NOTE: ALL Color Collections and Textures by Scranton Products & ASI Global Partitions are available in Class B fire ratings - additional lead times should be anticipated.

E. Quality Assurance:

1. Manufacturer's Qualifications: A company regularly engaged in

manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

2. Installer's Qualifications: A company or individual, regularly engaged in installation of products specified in this section, with a minimum of 5 years experience.

2.02 HARDWARE

A. Door hardware shall be as follows:

1. Full length continuous piano hinges shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wrap around flanges, surface mounted, and thru-bolted to doors and pilasters with stainless steel one-way sex bolts. Hinges will be factory set to a full close position unless otherwise noted.
2. Each door shall be furnished with one coat hook/bumper of heavy chrome plated Zamack with rubber bumper (handicapped doors also include one door pull and one wall stop).
3. Door strike and keeper shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wrap around flange, surface mounted, and thru-bolted to pilaster with one-way stainless steel sex bolts. Strike shall be heavy duty 6-inch strike plates. Bumper shall be made of extruded black vinyl.
4. Door latch housing shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish, surface mounted, and thru-bolted to door with one-way sex bolts. Slide bolt and button shall have a black anodized finish.

B. Pilaster shoes shall be made of 20 gauge stainless steel, 3 inches high. Pilaster shoes shall be anchored to finish floor with No. 5 Plastic Anchors and stainless steel tamper resistant Torx head sex bolt.

C. Full length continuous wall brackets 6364-T5 alloy with mill finish weighing not less than 1.685 lbs. per linear foot, similar and equal to Scranton Products 1 ½" stirrup type shall be used for all panels to pilaster, pilaster to wall, and panel to wall connections. Wall brackets shall be predrilled by manufacturer with holes spaced every 6 inches along the full length of the brackets. Wall brackets shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment of bracket to adjacent wall construction shall be accomplished by one theftproof Zamac mushroom nail in head anchor directly behind the vertical edge panels and pilasters at every 12 inches along the full length of the bracket and two No. 5 plastic anchors and No. 14 x 1 1/4-inch stainless steel Phillips head screws at each 12 inch interval alternately spaced between anchor connections.

D. Headrail shall be heavy aluminum extrusion (6364-T5 Alloy) with mill finish in anti-grip configuration weight not less than 1.188 lbs. per linear foot similar and equal to Scranton Products, Section No. 58993. Headrail shall be fastened to tops of pilasters

and headrail brackets by thru-bolting with one-way stainless steel sex bolts.

- E. Headrail brackets shall be 20-gauge stainless steel with a satin finish and secured to the wall with a stainless steel tamper resistant torx head screw.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Erection of partitions, etc. shall be in accordance with the manufacturer's standard recommendations and the following:
 - 1. All parts shall be erected in a substantial manner, straight, level, and plumb.
 - 2. No evidence of drilling, cutting, or patching shall be visible in the finished work.
 - 3. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/16-inch.
 - 4. Finished surfaces shall be cleaned after installation and left free of imperfections.
 - 5. Doors and panels shall be mounted at 14" above finished floor unless otherwise indicated.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10810 - TOILET ACCESSORIES - (Educational)

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Cabinet-type toilet accessories.
 - 1. Roval Collection.
 - 2. Profile Collection.
 - 3. Traditional Collection.
- B. Toilet accessories.
- C. Grab bars.
- D. Electric hand dryers.

1.02 RELATED SECTIONS

- A. Section 09260 - Gypsum Board Assemblies.
- B. Section 09300 - Ceramic / Porcelain Tile.
- C. Section 10155 - Toilet Compartments.
- D. Section 10811 - Electric Hand Dryers.

1.03 REFERENCES

- A. Americans with Disabilities Act Accessibility Guidelines (ADA).

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's product data for products specified, indicating selected options and accessories.
- C. Shop Drawings:
 - 1. Plans: Locate each specified unit in project.
 - 2. Elevations: Indicate mounting height of each product.
 - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement, and materials required for installation of specified products.
- D. LEED Requirements: Provide products required by this section with attributes that contribute to the project sustainability goals:
 - 1. MR Credit 4.1 - Recycled Content (post-consumer).
 - 2. MR Credit 4.2 - Recycled Content (post-industrial).
- E. Verification Samples: Two sample chips of each specified color and finish.

- F. Quality Assurance Submittals:
 - 1. Manufacturer's printed installation instructions for each specified product.
 - 2. Documentation of Manufacturer's Qualifications, specified in 1.5 of this Section.
- G. Closeout Submittals: Warranty, issued and executed by manufacturer, and countersigned by Contractor.
- H. All accessories to be type 304 stainless steel and be shown on technical data sheets as such.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum five years documented experience producing products specified.
- B. Source Limitations: To the greatest extent possible products shall be provided by a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Ship products in manufacturer's standard protective packaging with vinyl coating on exposed surfaces.
- B. Storage and Protection: Store products in manufacturer's protective packaging until installation.

1.07 SEQUENCING

- A. Supply locations, dimensions, and other pertinent details to installing Contractor for coordination of blocking, support and recess size and locations required for accessory installation.

1.08 WARRANTY

- A. Manufacturer's standard warranty against defects in product workmanship and materials.
- B. Manufacturer's 15-year warranty against silver spoilage of mirrors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. **Basis of Design:** *American Specialties, Inc.*; 441 Saw Mill River Road, Yonkers NY 10701-4913. ASD. Tel: (914) 476-9000. Fax: (914) 476-0688. Email: info@americanspecialties.com. Web: <http://www.americanspecialties.com>.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01300.

2.02 CABINET-TYPE TOILET ACCESSORIES (ROVAL COLLECTION)

A. Basic Construction Requirements:

1. Doors: Curved design, one piece stainless steel.
2. Cabinets: Stainless steel, trim-less; joints welded, sight-exposed welds finished to match sheet finish. Full access back panels.
3. Hinges: Concealed, multi-staked stainless steel piano hinge, full length of cabinet.
4. Locks: 2 flush, rimless tumbler locks, keyed alike other toilet accessory locks, with one key for each lock.
5. Exposed Finish: Satin finish, unless noted otherwise.

B. Feminine Hygiene Disposals:

1. **Provided by District, installed by General Contractor**

C. Feminine Hygiene Vendors: Roval Collection by ASI.

1. Recessed Dual Sanitary Napkin and Tampon Dispenser: **ASI Model 04684**. Dispenses 31 napkins and 22 tampons. Door made of 18 ga type 304 satin finish stainless steel, with two flush tumbler locks. Universal coin mechanism is convertible for 25 cents, 50 cents or FREE (no coin) operation. Coin boxes have different lock and key than doors and collar for surface mounting. Provide and install **ASI Model 04684-9 Surface Mounting Adaptor Collar** with all units supplied.

G. Mirrors: Roval Collection by ASI. (All mirrors to be tempered)

1. Stainless Steel Mirror (Tempered Glass): **ASI Model 20650-B**. The gently radius edges provide added strength and complement the curves of the ASI Roval Collection. Frame fabricated of 18 ga type 304 stainless steel with satin finish and polished seamless mitered corners. 1/4 in (6.4 mm) thick plate glass mirror.
2. Stainless Steel Mirror with Integral Shelf: **ASI Model 20655-B**. The gently radius edges provide added strength and complement the curves of the ASI Roval Collection. Mirror frame and 6 in (152 mm) wide curved edge shelf are fabricated of 18 ga type 304 stainless steel with satin finish. Mirror frame has polished seamless mitered corners. 0.25 in (6.4 mm) thick tempered glass mirror.

2.03 CABINET-TYPE TOILET ACCESSORIES (PROFILE COLLECTION)

H. Basic Construction Requirements:

1. Doors: 16 ga stainless steel, formed 15/16 in (23.8 mm) return to wall, with vertical edges eased at 3/4 in (19 mm) radius; welded corners.
2. Cabinets: 20 ga stainless steel, formed 1 in (25 mm) wide flat perimeter trim four sides; joints welded, sight-exposed welds finished to match sheet finish.
3. Hinges: Stainless steel piano hinge, 3/16 in (4.8 mm) dia barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Flat rimless tumbler locks, keyed like other toilet accessories, with two keys for each lock.
5. Cabinet and Door Finish: Satin finish.

I. Toilet Tissue Dispensers/holders:

1. **Provided by District, installed by General Contractor**

2.04 CABINET-TYPE TOILET ACCESSORIES (TRADITIONAL COLLECTION)

J. Basic Construction Requirements:

1. Doors: 22 ga stainless steel, double pan construction, with 1/4 in (6 mm) thick structural fiberboard core.
2. Cabinets: 22 ga stainless steel, formed perimeter trim with 1/4 in (6 mm) return to wall four sides; joints welded, sight-exposed welds finished to match sheet finish.
3. Hinges: Stainless steel piano hinge, 3/16 in (4.8 mm) dia barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Tumbler locks, keyed like other toilet accessories, with two keys for each lock.
5. Cabinet and Door Finish: Satin finish.

K. Paper Towel Dispensers:

1. **Provided by District, installed by General Contractor.**

2.05 TOILET ACCESSORIES

A. Basic Construction Requirements:

1. Doors: 22 ga satin stainless steel, formed hems at sight-exposed edges.
2. Cabinets: 22 ga satin stainless, formed hems at sight-exposed edges; joints welded.
3. Hinges: Stainless steel piano hinge, 3/16 in (4.8 mm) dia barrel, full length of cabinet; hinge leaves spot-welded to door and cabinet body.
4. Locks: Tumbler locks, keyed alike other toilet accessories, two keys for each lock.

- B. Custodial Accessories: As manufactured by ASI.
1. Utility Shelf with Mop Holders and Rag Hooks: Type 304 satin stainless. Shelf is 8 in (200 mm) deep with 3/4 in (19 mm) return for rigidity. Mop holders are riveted to strip and rubber cam is ribbed for grasping. Rod and hooks for wet rags included.
 - a. **ASI Model 1315-4**: 4 mop holders/3 rag hooks, 36 in (915 mm) long.
- C. Mirrors: As manufactured by ASI. (All mirrors to be B-tempered)
1. Roval Stainless Steel Mirror with Integral Shelf: **ASI Model 20655**. Gently radiused edges match the ASI Roval design. Frame fabricated of 18-gauge type 304 stainless steel with satin finish and polished seamless mitered corner. 0.25 in (6.4 mm) thick plate glass mirror.
- D. Changing Station Curtain Rods: As manufactured by ASI.
1. Curtain Hook: **ASI Model 1200-SHU**. Stainless steel hook for rods 1 in (25 mm) and 1-1/4 in (32 mm) dia.
 2. Vinyl Curtain: **ASI Model 1200-V**. Flame resistant, anti-bacterial, 8 ga vinyl fabric. Curtain shall be 6 in (150 mm) wider than opening up to 48 in (1220 mm) and 12 in (305 mm) wider than openings exceeding 48 in (1220 mm). Sizes and colors as scheduled or indicated on Drawings.
 3. Extra Heavy-Duty Curtain Rod: **ASI Model 1204**. Flanges 3 in (75 mm) dia, 20 ga type 304 satin stainless. 1-1/4 in (32 mm) dia rod, 18 ga type 304 satin stainless tubing. Available in lengths up to 96 in (2440 mm).
- E. Soap Dispensers: As manufactured by ASI.
1. **Provided by District, installed by General Contractor**
- F. Towel and cloth Hooks: Single As Manufactured by ASI
1. Single Robe Hook: **ASI Model 7308**. Extends 2-5/16 in from wall or door. Suitable for robes, clothing or small bags. Robe Hook shall be type 304 stainless steel alloy 18-8. Wall flange shall lock to wall bracket with stainless steel M5 hex socket set screw concealed on bottom perimeter of flange. Post shall be 22 gauge tubing with formed 18 gauge threaded bracket welded inside end. Hook shall be solid pin. Flange shall be 1/16" (1.5) thick with 3/32" (2.3) thick sides and heavy reinforcement ribs. Post shall be bolted to flange with concealed and locked M6 (Ø1/4") screw. All exposed surfaces shall have satin finish. Wall bracket shall be 18 gauge with embossed ribs for added strength and shall have two (2) mounting slots to accommodate M4 pan head screws (provided) and allow slight installation alignment adjustment. Hex L-key (M2.5) is provided to lock set screw to secure unit to wall bracket

2.06 GRAB BARS

A. Grab Bars:

1. Size: Straight grab bar, lengths as indicated on Drawings.
2. Covers: Snap over flange to conceal screws; type 304 stainless steel, 22 ga, 3-3/16 in (81 mm) dia.
3. Concealed Mounting Flanges: 3-1/8 in (79 mm) O.D. dia with two screw holes and three locking dimples; 1/8 in (3 mm) thick, type 304 stainless steel.
4. Series: 3700 Series by ASI; 1-1/4 in (32 mm) dia handrail with snap-on flange covers.

a. Product: **ASI Model 3700-P Series**, with peened surface.

2.07 ELECTRIC HAND DRYERS

- A. Excel Dryer, Inc., Xlator, Model XL-W (electronic controls). Provide at locations and in quantities as indicated on the Drawings. If not shown in the drawings, only paper towel dispensers are required. Surface mounted, cover shall be one piece heavy-duty, die cast zinc alloy, 5/8" HP motor with air velocity of 16,000 LFM at the air outlet (900 W heating element). Power requirements: 120V, 12.5 amp, 60 Hz. Provide internal noise reduction nozzles.

2.08 NARCOTICS CABINETS: FOR NURSES OFFICE;

- A. Not Applicable

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.
1. Verify reinforcement and anchoring devices are correct type and are located in accordance with shop drawings.
- B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.02 INSTALLATION

- A. Install toilet accessories plumb and level in accordance with shop Drawings and manufacturer's printed installation instructions.
- B. Locate toilet accessories at heights and locations required for compliance with local accessibility regulations and the Americans with Disabilities Act.

3.03 CLEANING

- A. Remove manufacturer's protective vinyl coating from sight-exposed surfaces 24 hours before final inspection.
- B. Clean surfaces in accordance with manufacturer's recommendations.

3.04 PROTECTION OF INSTALLED PRODUCTS

- A. Protect products from damage caused by subsequent construction activities.
- B. Field repair of damaged product finishes is prohibited; replace products having damaged finishes caused by subsequent construction activities.

END OF SECTION

DIVISION 11 - EQUIPMENT

SECTION 11400 - FOOD SERVICE EQUIPMENT

PART 1 - GENERAL SPECIFICATIONS

1.01 GENERAL REQUIREMENTS:

Work of this Section shall conform to the requirements of the Contract Documents.

1.02 GENERAL CONDITIONS

A. CONTRACT DOCUMENTS:

1. Contract Documents for the F.S.E.C. include:

- (a) All Food Service Equipment Design Drawings including Connection Plans and related Detail Drawings.
- (b) These written General Conditions, All General & Itemized Food Service Written Specifications, and Design Details.
- (c) All related Addenda issued prior to execution of this Contract.
- (d) Architect's, Engineer's and any and all other Consultant's Plans & Specifications.

2. Food Service Design Drawings and Written Specifications are intended to complement each other, so that neither is complete without the other. The F.S.E.C. should not submit bids, enter agreements, or entertain execution of this Contract without complete access to all Contract Documents.

3. Food Service Design Drawings and Specifications are for assistance and guidance of the F.S.E.C. and indicate the arrangement and location of equipment. Exact locations, distances, and levels will be governed by the building. The F.S.E.C. shall accept their Contract with this understanding.

4. The Food Service (Design) Consultant will furnish any additional assistance that may be necessary for the execution of the work. The F.S.E.C. should not perform any work without drawings and/or written instructions.

5. IMPORTANT: All drawings, written specifications and other related data prepared and/or furnished by the Food Service (Design) Consultant are for DESIGN INTENT ONLY and are NOT to be used for Construction purposes or as Shop Details related to any work included in this Contract.

1.03 DESCRIPTION:

A. WORK INCLUDED:

Food Service Equipment required for this work is indicated on the drawings and includes, but is not necessarily limited to the following:

1. Furnish all labor, materials and services necessary to complete the work of this Section.
2. Supplying and setting in place all new Food Service Equipment and appliances as shown on the Food Service Contract Drawings and listed in the "Schedule of Food Service Equipment"(unless otherwise indicated).
3. Relocating all Existing Food Service-related Equipment Items indicated as such on Food Service Equipment Contract Drawings and/or Written Specifications (unless otherwise indicated).
4. All Food Service Custom Stainless Steel Equipment is to be fabricated by a firm with a minimum of five (5) years experience in the manufacture of Commercial Food Service Custom Stainless Steel Equipment.
5. All Food Service Custom Millwork is to be fabricated by a member of the Architectural Woodwork Institute (A.W.I.), in good standing, with a minimum of five (5) years experience in the manufacture of Commercial Food Service Cabinetry.

B. RELATED WORK (BY OTHERS):

1. Electrical Service and connection to Food Service Equipment, Overload Protection Requirements wiring between starters, when starters and controls are not integral with equipment.

Electrical Contractor shall make final connection of drain line heaters to the terminal block on refrigeration coil(s).
2. Plumbing Work and Connections, including fittings which are not integral part of equipment, floor drains, water and waste lines to refrigeration compressors including their connections, and miscellaneous Plumbing Work, except as otherwise specified in this Section or noted on Food Service Contract Drawings.
3. Heating, Ventilating and Air Conditioning (alternately referred to as Commercial Kitchen Ventilation) except as otherwise specified in this Section or noted on Food Service Contract Drawings.
4. Concrete, Masonry and Miscellaneous Metals, except as otherwise specified in this Section or noted on Food Service Contract Drawings.
5. Unless otherwise specified, all Food Service Smallwares Items (such as Cash Registers, Cashiers' Stools, Pots, Pans, Dishes, Glassware, Trays, Silverware, etc.) will be provided by the Owner.

6. Unless otherwise specified, all required Food Service-related Signage and Marketing Paraphernalia, etc. shall be provided by the Food Service Management Company and/or the Owner for installation by the General Contractor.

1.04 QUALITY ASSURANCE:

A. MANUFACTURER'S INSTRUCTIONS:

In addition to the requirements of these specifications, comply with Manufacturer's Instructions and Recommendations for all phases of work.

B. STANDARDS (shall include but not be limited to the following):

1. Underwriters' Laboratories (U.L.).
2. Published standards of the National Sanitation Foundation (N.S.F.).
3. American Society of Mechanical Engineers.
4. National Fire Protection Association (N.F.P.A.) Standards Pamphlet No. 96.
5. National Electrical Code.
6. Published standards of the Architectural Woodwork Institute (A.W.I.).
7. All applicable National, State and Local Codes.

1.05 QUALIFICATION:

To be considered eligible to work on this project, the Contractor for the work of this Section of Specifications must:

- A. Be a fully recognized Commercial Food Service Equipment Contractor currently engaged in the installation of standard manufactured and custom fabricated commercial Food Service Equipment for a period of five (5) years prior to submitting bid.
- B. Have successfully completed similar projects of the same Food Service Equipment design scope within the last two (2) years.
- C. All Food Service Custom Millwork is to be fabricated by a member of the Architectural Woodwork Institute (A.W.I.), in good standing, with a minimum of five (5) years experience in the manufacture of Commercial Food Service Cabinetry.

1.06 PRODUCT HANDLING:

A. PROTECTION:

Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed work and materials of all other Trades.

B. REPLACEMENT:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and Food Service Consultant at no additional cost to the Owner.

1.07 SUBMITTALS:

A. SHOP DRAWINGS:

Shop drawings shall be submitted in accordance with requirements of the General Conditions and shall include, but not be limited to, the following:

1. Floor plans, showing detailed dimensions for utility lines and equipment to a scale of 1/4" equals 1'-0".

These dimensions shall be taken from finished walls and columns and include all electrical and plumbing floor "stub-up", "out of wall" and "Branch To Connection (B.T.C.)" notations for use in the Field.

2. Floor plans, showing detailed dimensions for elevated bases, floor depressions, wall openings, locations of partitions and wall reinforcing as related to equipment supplied under this Section, to a scale of 1/4" equals 1'-0".
3. Dimensioned Equipment Construction Drawings, indicating reinforcement, anchorage and other work required for completion and installation of equipment under this Section, to a scale of 1/4" equals 1'-0".
4. Schedule of Equipment and Connections: Furnish a detailed Equipment Schedule similar to what is shown on Food Service Contract Drawings including all Remarks and General Notes.

This Equipment Schedule shall be submitted with the Mechanical Rough-In, H.V.A.C. (C.K.V.) and Special Conditions Drawings (i.e. Floor Penetration Plan and Critical Dimensions/Wall Blocking Plan) as part of the Food Service Shop Drawing Set.

5. Specified Custom Manufacturer's Shop Drawings, indicating all aspects of their Custom Fabricated Equipment (i.e., Walk-In Boxes and related Refrigeration Systems, Food Service Exhaust Hoods, Ventilation Fans & related Fire Suppression Systems, Commercial Food Service Millwork Cabinetry and Countertops etc, to a minimum scale of 1/4" equals 1'-0".
6. All required Food Service-related shop drawings shall be submitted electronically via e-mail as PDF Files to all Concerned Parties for review and approval and returned to F.S.E.C. in the same manner.

B. BOOK OF MANUFACTURER'S CATALOGUE CUT SHEETS:

1. All required Food Service-related Manufacturer's standard Catalog Cut Sheets shall be compiled together in booklet form. They shall be arranged numerically by Project Item Number to correspond with the as shown on the Food Service Contract Drawings and listed in the "Schedule of Food Service Equipment".
2. All Cut Sheets shall be preceded by a corresponding Cover Sheet. Each Cover Sheet and shall include the Item Number, Model Number, Manufacturer's Name, Required Utilities, and all specified. Options and Accessories.
3. The Cut Book shall be submitted electronically via e-mail as a PDF File to all Concerned Parties for review and approval and returned to the Food Service Equipment Contractor (F.S.E.C.) in the same manner.

C. SUBMITTAL STANDARDS:

1. Reproductions or enlargements of Food Service Contract Drawings submitted for use in lieu of proper shop drawings as hereinbefore described will be not acceptable.
2. Submission of any Shop Drawings containing isometric-type details of Custom Fabricated Equipment will not be acceptable unless they are similar to ones already found on the Food Service Contract Drawings.
3. Typically, details for all Custom Fabricated Food Service Equipment shall include fully detailed plan, elevation and section views of all applicable specified Items.

1.08 PRIOR APPROVALS:

The prospective Contractor for the work of this Section of the Specifications shall submit all proposed alternate equipment manufacturers (substitutions) in writing to the Architect PRIOR to submitting their bid. This request shall be accompanied by the following information:

- A. List of five (5) similar installations having equipment being proposed for in this project and date of completed installations.
- B. Complete literature, performance and technical data describing the proposed equipment, as noted above in Section 1.04 (e).

1.09 SUBSTITUTIONS:

- A. Prior written approval of the Architect and the Food Service Consultant is required for proposed Alternate Equipment.
- B. If no Substitutions are submitted prior to Bid Date, it will be presumed by all Parties Concerned that none are being offered, and the Bid is being submitted in full accordance with the Contract Documents.
- C. NO ALTERNATE EQUIPMENT (SUBSTITUTIONS) WILL BE CONSIDERED AFTER CONTRACT HAS BEEN AWARDED.
- D. Bid must be submitted with all specified manufacturers and model numbers. Alternate prices may be submitted for substituted Equipment Items as SEPARATE LINE ITEMS not inclusive of the Base Bid.
- E. All Substitutions must meet the Utility Requirements of the specified Base Item. The F.S.E.C. shall bear the responsibility of any costs associated with the failure to match those Utility Requirements.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. STAINLESS STEEL: Where specified, shall be Type 304, No. 4 finish.
- B. GALVANIZED STEEL SHEETS: Shall conform to ASTM-A164, Type RS. Where galvanized steel has been welded; seams shall be thoroughly cleaned and finished with one coat of zinc-rich paint (70% zinc). Galvanized structural steel shall conform to ASTM-A123 and A-153. Hot dip galvanization shall conform to ASTM-A386.
- C. STEEL PIPE: Shall be fully galvanized. All threads are to be cleaned and coated with rust-resistant coating.
- D. STRUCTURAL SHAPES: All angles, band channels, etc., used for framing shall conform to ASTM-A36.
- E. FASTENINGS: All bolts, screws, nuts, and washers shall be stainless steel, except that where brass is fastened, the fastenings shall be brass. Where dissimilar metals are fastened, bolts, screws, and nuts shall be made of an approved non-corrosive metal.
- F. SILICONE SEALANT: All Custom Food Service Equipment fabricated from either Stainless Steel, Millwork Cabinetry or engineered (man-made) Stone (Quartz)-and/or Corian-type Solid Surface material shall be sealed to building surfaces (including walls, floors, ceilings, etc.) in an approved manner using silicone sealant specifically approved for use in Commercial Food Service Facilities.
- G. STAINLESS STEEL COUNTERTOPS: When specified, each shall be 14-gauge stainless steel, unless otherwise specified and shown on Food Service Design Drawings.

- H. STEEL SURFACES: All Stainless Steel Fascias, Counters and Surfaces shall be fully welded and seamless. All grains to run horizontally.
- I. MILLWORK STONE (QUARTZ) COUNTERTOPS: Whenever specified, each shall be standard 3cm thickness for use in Commercial Foodservice Applications.

This Engineered (man-made) Stone (Quartz)-Surface Material shall be tested and certified by the National Sanitation for Food Safety and Food Contact under the N.S.F. 51 Certification and Greenguard Indoor Air Quality Certified (reg). Unless otherwise specified or shown on Food Service Design Drawings and/or Architectural Design Drawings.

Color and pattern of Engineered Stone (Quartz)-Surface Material shall be as hereinafter specified or shown on drawings by the Architect and/or Food Service Consultant.

- J. MILLWORK SOLID SURFACE COUNTERTOPS: Whenever specified, each shall be standard 12m thickness for use in Commercial Foodservice Applications.

Engineered (man-made) Solid-Surface Material tested and certified by the National Sanitation for Food Safety and Food Contact under the N.S.F. 51 Certification and Greenguard Indoor Air Quality Certified (reg). Unless otherwise specified or shown on Food Service Design Drawings and/or Architectural Design Drawings.

Color and pattern of Solid Surface Material shall be as hereinafter specified or shown on drawings by the Architect and/or Food Service Consultant.

- K. MILLWORK CABINET SUBSTRATE: Shall be of Marine Grade Plywood, manufactured with a formaldehyde-free adhesive system, which meets physical properties of ANSI A208.2-2009 Grade 155 Specifications.

- L. PLASTIC LAMINATE MATERIAL: Shall be Decorative plastic (.020) on Phenolic backing (.050) for contact adhesive bond to substrate that conforms to ASTM E84-05.

Color and pattern of Plastic Laminate material shall be as hereinafter specified or shown on drawings by the Architect and/or Food Service Consultant.

NOTE: Unless otherwise specified and shown on drawings, color and pattern of Plastic Laminate material shall run in one (1) direction.

- M. METAL LAMINATE: Shall be Decorative aluminum (.020) on Phenolic backing (.050) for contact adhesive bond to substrate that conforms to ASTM E84-05.

Color and pattern of Metal Laminate material shall be as hereinafter specified or shown on drawings by the Architect and/or Food Service Consultant.

NOTE: Unless otherwise specified and shown on drawings, color and pattern of Metal Laminate material shall run in one (1) direction.

- N. STEEL SURFACES: All Stainless Steel Fascias, Counters and Surfaces shall be fully welded and seamless. All grains to run horizontally.

2.02 WORKMANSHIP:

- A. FASTENERS: Except as otherwise specified or approved by the Architect and the Food Service Consultant, exposed finished surfaces shall be free from bolts, screws, and rivet heads. Wherever threads of bolts and screws occur on the inside of fixtures and are either visible or might come in contact with hands or wiping cloths, such bolts and screws shall be capped with a suitable lock washer and chrome plated brass or bronze acorn nut.

Where screw threads are welded to the underside of trim and tops, their spacing and intent of rivets, bolts, and screws shall be such as to insure proper fastening and prevent bulging of the materials fastened.

- B. WELDS: Shall be continuous, strong, and ductile, with excess metal ground off joints finished smooth to match adjoining surfaces. All joints in tops of fixtures, tables, drain boards, overselves, sinks and other equipment shall be welded. Wherever material has been depressed by a welding operation, such depressions shall be suitably hammered and peened flush with the adjoining surface and, if necessary, be ground again to eliminate low spots.

1. GRINDING: Care shall be exercised in all grinding operations to avoid excessive heating of the metal, causing discoloration. In all cases, the grain of rough grinding shall be removed by successive polishing operations.

Wherever such break bends occur, they shall be free of undue extrudence and shall not be flaky, scaly, and cracked in appearance. Where such breaks mar the uniform surface appearance of the materials, all such marks shall be removed.

2. EDGES/MITRES/CORNERS: Sheared edges shall be free from burrs, fins, and irregular projections, and shall be finished to obviate all danger of cutting and laceration when the hand is drawn over the edge. Miters and bullnosed corners shall be welded.

3. WELDING SCHEDULE: All Welding shall be performed during night or weekend hours as coordinated with the General Contractor.

Food Service Equipment Contractor to provide Fire Safety Watch whenever welding is done.

- C. EXPOSED STAINLESS STEEL: All surfaces shall have a No. 4 finish as hereinbefore specified. An exposed surface shall be interpreted as meaning outside surfaces exposed to view and inside surfaces exposed to view when a sliding or swinging door is opened. The underside of a shelf may be a No. 80 ground finish.

- D. UNDERSIDE OF TOPS: All work tops, dishtables and drain boards shall be treated with an approved spray-on sound deadening material with an aluminum spray finish. Sound deadening shall be applied to fixtures after tops have been completely fabricated.

- E. SOLDERING: Shall be done in strict accordance with recommended procedures of the stainless steel manufacturer. In no case shall soldering be relied upon for the stability of seams and joints. The soldering shall serve only as filler to prevent leakage. Soldering shall not at any time be used in and on any surfaces, which may come in contact with foods. Soldering shall not at any time be considered as replacing welding or brazing.
- F. EQUIPMENT: All equipment shall be mechanically fastened to walls, floors, or ceiling and assembled together.
- G. PROTECTIVE COVERINGS: All protective coverings shall be furnished and maintained for the protection of the equipment until ready for inspection and demonstration.
- H. FIELD CONDITIONS: Where mechanical or structural field conditions have direct cause to alter equipment specified in any manner, notify the Architect and Food Service Consultant in writing for directional purposes before proceeding with that portion of the work.
- I. CONTROL DEVICES: All fittings, control valves, plumbing works, or electrical operating switches, furnished as part of the equipment shall match and equal in every respect those specified under the Mechanical and Electrical Sections of the Specifications.
1. Each piece of apparatus shall have, in addition to mainline control valves, individual operating valves, so that any piece of apparatus may be removed for repairs without interruption of the remaining apparatus.
 2. All such valves, switches, and fittings shall be located at a point of greatest convenience for operation and shall be furnished by the F.S.E.C. (unless otherwise specified or noted on Food Service Design Drawings).
- J. APPURTENANCES AND ACCESS PANELS: Provide all appurtenances which may not be specifically mentioned in the specifications or shown on drawings but which are required for the proper functioning of the equipment.
- This shall also include plumbing fittings or electrical controls which are not normally furnished by the manufacturer for the proper equipment functioning. Provide proper access panels to service equipment within the units.
- K. STARTING SWITCHES: Unless otherwise specified or noted on Food Service Design Drawings, F.S.E.C. to furnish starting switches, including those required for remote installation to the Electrical Contractor who shall install and wire same.
- L. PIPES, FITTINGS & VALVES: All pipes, fittings and valves required within the equipment shall be furnished with respective items of equipment. Exposed plumbing, piping, fittings, valves and conduit shall be chrome plated (unless otherwise specified or noted on Food Service Design Drawings).

2.03 OTHER MATERIALS:

All other materials not specifically described but required for a complete and proper installation of the work of this Section, shall be provided by the General Contractor and shall be new, first quality of their respective kinds, and subject to approval of the Architect and/or the Food Service Consultant.

2.04 CUSTOM FABRICATED STAINLESS STEEL EQUIPMENT:

A. SINKS, DRAINBOARDS & DISHTABLES: Unless otherwise specified, all sinks, drain boards and dish tables shall be constructed of 14-gauge stainless steel as follows:

1. Joints shall be welded. Front and ends, unless otherwise indicated on drawings, shall be extended 3 inches, measured at sink edge, and rolled on a diameter of 1-1/2 inch, 180°. Raised, rolled rim at front and ends of drainboard shall be leveled with sink rolled rim and continuous there with and shall not follow the pitch of the drainboard. Typically, drain boards shall be pitched 1/8" per 1'-0" towards sink compartments.
2. Sinks and drainboards adjacent to walls or adjoining equipment shall have 10-inch high splashbacks, level and continuous, not following the pitch of drain boards. Where drain boards are 24 inches or less, they shall be supported on one inch outside diameter by 16 gauge stainless steel tubular, seamless diagonally braces and secured to sink gussets, welded around entire perimeter.

Where drain boards exceed 24 inches in length, legs shall be provided. All vertical and horizontal corners shall be rounded to a radius of approximately one inch, with intersections meeting in the spherical sections.

3. All sinks having two or more compartments shall have double dividing partitions with fully rounded corners, both vertical and horizontal. All corners of rolled rim shall be fully rounded outside roll and be concentric with inside roll.

The bottom of each sink compartment shall be creased to a sufficient pitch toward a waste outlet. Openings for hot and cold faucets shall be cut into splash-backs as required. All sinks shall be 16 inches deep, unless otherwise specified or indicated on drawings. All required divider panels shall be a minimum of 3/4 inch thick double wall stainless steel construction.

4. WATER INLETS for all sinks shall be located (in all instances) above the positive water level to prevent siphoning of liquids into the building Water System.
5. WORK SINK WASTE (OUTLET) VALVES: Each work sink compartment (including Bain-Marie type sink compartments but excluding all Hand Wash Sinks) shall be provided with a waste outlet valve. Each waste outlet, except as otherwise specified, shall be a twist-handle type valve constructed of the best grade chrome plated cast brass or bronze. Model number shall be as hereinafter specified.

Each waste outlet valve shall be free-flowing, non-clogging type, with a perforated strainer of stainless steel on the interior of the sink bottom, have a two inch pipe size thread at the lower end, and shall be furnished with chrome plated locknut washers and chrome plated tailpiece.

The outlet shall be set into a die depression and attached without rivets to the sink bottom, and shall be furnished with externally operated stainless steel twist handles. The outer body of the sink basin shall have an opening threaded to receive 1-1/4 inch diameter overflow fitting at the rear.

Overflow fitting shall be brass chrome plated, provided with a stainless steel strainer on the sink basin interior and shall be connected to the waste outlet by means of 1-1/2 inch diameter brass pipe tubing which shall be chrome plated, except as otherwise specified.

6. HAND SINK DRAIN OUTLETS: Each Hand Wash Sink shall be furnished with a free-flowing-type drain outlet fitted with a strainer to prevent the ability to hold water in the sink basin. Model number shall be as hereinafter specified.

NOTE: Hand Sinks fitted with lever or twist-type waste valves that would hold water will not be accepted.

Each drain outlet for Hand Wash Sinks shall measure 1-1/2 inch in diameter, unless otherwise specified or shown on Food Service Design Drawings.

7. TYPICAL SINK DESIGN: Stainless Steel Sinks set into stainless steel work counters or table tops shall be constructed of same gauge and materials as specified for the adjacent stainless counter top and fabricated as follows:
 - (a) Top perimeter of each sink shall be integrally welded to edge of opening in table or counter top. Table or counter top shall be die-punched to receive faucets.
 - (b) Sinks shall have vertical and horizontal corners rounded on a 1 inch radius, with bottoms pitched to either a 1-1/2 inch or 2 inch diameter waste outlet valve, (depending which size is specified or indicated on drawings).
 - (c) Sinks shall have the same exterior metal finish as adjacent table or counter top surfaces. All visible welds shall have the same matching finish.
8. DRAINBOARDS shall be constructed same as previously specified for sinks, unless otherwise indicated on drawings.
9. DISHTABLES shall be constructed same as previously specified for sinks and drain boards, unless otherwise indicated on drawings.

10. SOUND DEADENING UNDER TOPS: The underside of all drainboards and dishtables shall be properly "sound deadened" to prevent excessive noise during everyday use.

If specified, additional spray-on type sound deadening material shall be applied to the underside of each drain board.

- B. STAINLESS STEEL TABLE TOPS: Unless otherwise specified, all stainless steel table tops shall be 14 gauge polished stainless steel constructed as follows:

1. FABRICATION TYPE: Tables shall be of "All-Welded" (a/k/a "Uni-Welded" - type construction). Edges shall be rounded and free from burrs and any excess material left from cutting and/or welding. Tops shall be rolled 180°, 2 inch in diameter on all exposed sides. Corners shall be rounded or bullnosed.
2. WALL SPLASHES: Where wall back or side splashes are indicated, they shall be turned up 5 or more inches (as hereinafter specified), and returned one inch diagonally to wall with all exposed ends welded closed.
3. CHANNEL UNDERBRACING shall be provided for drain boards, and dishtable tops, and shall be 1" x 4" x 1" channels of 14 gauge stainless steel, unless otherwise specified.

Bracing shall be welded to the underside of fixtures in a manner suitable to seal out vermin and also to create a noise deadening top surface. All channels shall extend the full length and depth of fixtures and shall be so positioned that no dimension exceeds 30 inches in any direction.

- C. STAINLESS STEEL LEGS & CROSS BRACING:

1. LEGS shall be constructed of not less than 1-5/8" o.d., 16 gauge stainless steel pipe. Legs shall be in no case spaced more than 6'-0" on centers.
2. LEG CROSS BRACING, where required, shall be constructed of not less than 1-1/4" o.d. x 16 gauge stainless steel tubing. All leg bracing shall run horizontal and level between all legs, approximately 10 inches above the floor, unless otherwise specified. All joints shall be completely welded around the entire perimeter, unless otherwise specified.

- D. STAINLESS STEEL LEG MOUNTINGS:

1. Units mounted on legs that are 14 inches or longer shall be provided with underbracing. Legs in such cases are to be provided with not less than 12 gauge stainless steel gussets, extending downward.
2. Gussets shall be die stamped, fully enclosed, drawn cylindrical or cone shaped of not less than 3 inches length, 2-1/2 inches in diameter at top. Gussets shall be welded continuously around entire circumference against the channel reinforcement.

3. On legs between 8 and 14 inches in height, gussets shall be provided, but no underbracing need be furnished.

- E. STAINLESS STEEL FEET: Each shall, typically, be stainless steel bullet type, having an integrally formed shaft with a minimum adjustment of approximately 1-1/2 inches without the use of threading or adjusting bolts. Bullet-type feet shall be completely sealed at bottom and be close fitting between tubular leg support & foot.

When specified or required, stainless steel flanged-type feet shall be furnished instead of bullet-type to positively secure oversized equipment items to the floor.

Flanged feet shall be fabricated with round mounting holes to accept standard screw-type fasteners that can be easily accessed for installation.

Flanged feet shall also have an integrally formed shaft with a minimum adjustment of approximately 1-1/2 inches without the use of threading or adjusting bolts. Flanged feet shall be completely sealed at bottom and be close fitting between tubular leg support and flanged foot. Outside perimeter where flange meets finished floor shall be fully silicone sealed.

- F. CASTERS shall be heavy duty-type. The required diameter, weight capacity and/or material of all casters (with or without brakes) for all custom fabricated stainless steel mobile equipment shall all be as hereinafter specified.

G. STAINLESS STEEL UNDERSHELVING:

1. Flat undershelving for custom fabricated tables shall be 16 gauge stainless steel, turned down on front and sides approximately 1-1/2 inches and under 1/2 inch to form a channel shape. Rear of shelf to be turned up 2 inches and hemmed.
2. Unless otherwise specified, all table undershelves shall be reinforced with a 1" x 4" x 1" x 14 gauge stainless steel hat channel, running full length of shelf. Shelves shall be notched to fit the contour of table legs, fully welded to legs and crevice free.
3. When specified, slotted undershelving for tables shall be constructed same as noted above except that die-stamped slots approximately 1-1/4 inches wide and 3 inches apart are to be furnished. Typically, these slots shall run front to back along the full length of each shelf.
4. Counter interior shelves and cabinet shelves shall be constructed of 16 gauge stainless steel. All shelves shall be of the removable type unless otherwise specified or shown on drawings and constructed in sections of not more than 30 inches in length for easy removal and cleaning.

H. STAINLESS STEEL DRAWER ASSEMBLIES:

1. Unless otherwise specified, all custom drawers shall be of the telescoping slide type with completely enclosed 16 gauge stainless steel housing, in sizes as hereinafter specified and shown on drawings.
2. Typically, provide drawers with 20" x 20" x 5" deep thermoplastic inside liner, to be removable without untracking, with vertical and horizontal radius corners, with the top edges flanged out to set into a 16 gauge stainless steel track and housing combination.
3. Drawer housing combination shall operate on a 16 gauge stainless steel outside locking track with heavy-duty telescoping slides, as hereinafter specified.
4. Drawer fronts shall have 16 gauge stainless steel front panel fitted with full-grip pull handles and cylinder locks as hereinafter specified.

I. STAINLESS STEEL WALL-MOUNTED SHELVES:

1. All custom wall-mounted stainless steel shelves shall be of length and configuration as shown on drawings or hereinafter specified.
2. All shelves shall be constructed of 16 gauge stainless steel, turned up 2 inches at both sides and rear, unless otherwise specified or shown on drawings.
3. Rear top edge of shelf shall be hemmed. Sides shall be fully welded and enclosed above and below shelf, flush with rolled edge as shown on Food Service Design Drawings.
4. Wall shelves shall be supported on 12 gauge stainless steel brackets spaced no more than 4'-0" on center. Brackets shall be welded to shelves as hereinbefore specified.
5. General Contractor shall furnish and install Wall Blocking required to support all wall shelves. All Wall Blocking shall be of appropriate size, shape and material as hereinafter specified and shown on Food Service Design Drawings. This blocking shall be mounted within building walls and concealed from view by the selected wall finish material.

J. STAINLESS STEEL TABLE OR COUNTER-MOUNTED OVERSHELVES:

1. All custom table or counter-mounted stainless overshelves shall be of length and configuration as shown on drawings or hereinafter specified.
2. All overshelves shall be constructed of 16 gauge stainless steel, turned up 2 inches at both sides and rear, unless otherwise specified or shown on drawings.

3. Rear top edge of shelf shall be hemmed. Sides shall be fully welded and enclosed above and below shelf, flush with rolled edge as shown on Food Service Design Drawings.
4. Overshelves shall be supported on 12 gauge stainless steel brackets fully welded to stainless steel uprights spaced no more than 4'-0" on center. Brackets shall be welded to shelves and uprights as hereinbefore specified.
5. Shelf uprights shall be of size and length as hereinafter specified and shown on drawings. Uprights shall be securely attached to understructure of table or counter in an approved manner so as to prevent any movement of overshef.

K. STAINLESS STEEL WALL CABINETS:

1. Custom Stainless Steel Wall Cabinets shall be of length and configuration as shown on drawings or hereinafter specified. Typically, these cabinets shall measure 13 inches deep x 30 inches high, (except if otherwise specified or shown on drawings).
2. Construct cabinets of 18 gauge polished stainless steel, of all welded construction, as hereinbefore specified. Exterior bottoms shall be of flush construction. All cabinets shall have sloped, dust-proof tops.
3. All "open-style" Wall Cabinets shall be of rectangular box construction with enclosed rear and ends. Each cabinet shall be provided with a fixed bottom shelf and either fixed (fully-welded) or removable and adjustable intermediate interior shelves (as hereinafter specified and shown on drawings).
4. All removable and adjustable intermediate interior cabinet shelves shall be of similar construction as hereinafter specified for shelves located inside stainless steel counters.

Unless otherwise specified or shown on drawings, each intermediate shelf shall be supported by four (4) stainless steel keyhole-type pilasters, as hereinafter specified. Each pilaster shall be fastened to interior of cabinet in lengths as required, with matching snap-in shelf supports (tabs).

5. Wall Cabinets specified with doors shall be of rectangular box construction with enclosed rear and ends and have either hinged or sliding stainless steel or millwork doors.
6. All hinged or sliding stainless steel doors for custom wall cabinets shall be fabricated in the same manner and furnished with the same hardware (i.e. handles, locks, hinges etc.) as similar doors hereinafter specified for Stainless Steel Counters.
7. General Contractor shall furnish and install wall blocking required to support all wall cabinets. All Wall Blocking shall be of appropriate size, shape and material as hereinafter specified and shown on Food Service Design Drawings. This blocking shall be

mounted within building walls and concealed from view by the selected wall finish material.

L. STAINLESS STEEL COUNTERS:

1. All Stainless Steel Counters shall be of length, width and configuration as shown on Food Service Design Drawings.
2. Unless otherwise specified or shown on drawings, all Stainless Steel Counters shall measure 2'-10" high to work surface (NOT including any required trayslide or back and/or end splashes).
3. STAINLESS STEEL TOPS: Counters shall have 14 gauge tops and 18 gauge bodies, unless otherwise specified or shown on drawings.
4. STAINLESS STEEL COUNTER CONSTRUCTION: Counters shall be of "All-Welded" (a/k/a "Uni Welded"-type construction). Tops shall be turned down 2 inches on all sides. Corners and edges shall be rounded and free from burrs and any excess material left from the fabrication process.

Understructure of counter shall be constructed as shown on drawings with space provided for separate "drop-in" or "built-in" Food Service Equipment or related components as hereinafter specified.

5. STAINLESS STEEL INTERIOR SHELVES: Interior cabinet sections to be provided with 18 gauge stainless steel bottom and (whenever feasible) adjustable intermediate shelves, each constructed as hereinbefore specified. Shelves shall be 30 inches deep (maximum) for easy reach.

All Intermediate shelves are to be removable and constructed in 30 inch (maximum) lengths for easy removal and cleaning. Each intermediate shelf shall be supported by four (4) stainless steel keyhole-type pilasters, as hereinafter specified. Each pilaster shall be fastened to interior of cabinet in lengths as required, with matching snap-in shelf supports (tabs).

6. ACCESS TO CABINET INTERIOR: Cabinets where interior access to Utility Lines (i.e. Plumbing, Electric or Data Communication Lines) is required shall have EITHER removable interior stainless steel panels located behind removable shelves OR shall have these removable shelves turned-up 6 inches at rear and hemmed.

Cabinets where this interior access is not required may have fixed interior back panels. All unless otherwise specified or shown on Food Service Design Drawings.

7. CUT-OUTS & OPENINGS IN STAINLESS STEEL COUNTERTOPS:

- (a) CUT-OUTS: Top and interior body of counter to be cut out and have any other openings, as required, to accept any and all "Buy-Out" Food Service Equipment and related components as hereinafter

specified. All "cut outs" and openings shall be finished in an approved and safe manner so as to prevent injury.

- (b) IMPORTANT: Unless otherwise directed, The F.S.E.C. shall coordinate and confirm that all related Food Service Equipment will be shipped to this Contractor's Fabrication Shop to be pre-fitted into each corresponding counter opening PRIOR to each counter leaving shop and/or being installed at the Jobsite.
- (c) ROUND PENETRATIONS FOR UTILITY LINES: Unless otherwise specified or shown on drawings, all penetrations in counter tops required to vertically run Utility Lines (i.e. Plumbing, Electric and Data Communication Lines) shall consist of round holes fitted with color coordinated rubber or plastic grommets. F.S.E.C. to properly size all required holes.

Whenever possible, each hole with grommet shall be positioned in a concealed location that prevents obvious viewing by Workers and Patrons.

- 8. LEGS FOR STAINLESS STEEL COUNTERS: Unless otherwise specified, all stainless steel counters shall be supported on 6 inch high, heavy-duty stainless steel legs. Each leg shall be adjustable and affixed to underside of counter body in an approved manner spaced no more than 5'-0" apart.

M. STAINLESS STEEL COUNTER AND CABINET DOORS:

1. STAINLESS STEEL HINGED DOORS:

- (a) Hinged Doors shall be constructed of 18 gauge stainless steel exterior and 20 gauge stainless steel interior unless otherwise specified.
- (b) Hinged Doors shall be double pan construction with all corners welded and shall be filled with an approved 1/2 inch thick sound deadener.
- (c) Doors shall be removable (unless otherwise specified and shown on drawings) and shall be designed to permit removal for cleaning and adjustment without the use of tools.

2. STAINLESS STEEL SLIDING DOORS:

- (a) Sliding doors shall be constructed of 18 gauge stainless steel exterior and 20 gauge stainless steel interior, unless otherwise specified.
- (b) Sliding doors shall be double pan construction with all corners welded and shall be filled with an approved 1/2 inch thick sound deadener.
- (c) Sliding doors shall be removable and shall be designed to permit removal for cleaning and adjustment without the use of tools.

Bolts and screws shall be kept to a minimum and shall be of corrosion resisting metal.

- (d) Spacers, where not exposed to view, shall be 14 gauge, 3/4 inch diameter stainless steel tubing. Upper suspension nylon rollers shall be heavy duty to fit stainless steel track so as to minimize wear and noise. Doors shall operate on rollers freely without friction or rubbing between doors, door suspensions and upper sliding framework including hardware.
 - (e) Double sliding doors shall be provided with double overhead tracks and carriers for maximum clear door opening. Units shall be provided with trackless bottom with concealed guide for overhead roller doors. Guides shall be equipped with limit stops to prevent telescoping of doors.
3. HARDWARE FOR STAINLESS STEEL DOORS: All hinges, catches, door handles and locking devices for all door types shall be provided as hereinafter specified.
4. STAINLESS STEEL DOORS & REMOVABLE PANELS FITTED WITH LOUVERS:
- (a) All Stainless Steel hinged doors and/or removable panels specified to enclose self-contained compressor compartments located within counter bodies shall be fitted with a fabricated louvered insert panel made of stainless steel or aluminum with an exterior finish as selected by the Architect and/or Food Service Consultant. All as hereinafter specified or shown on drawings.
 - (b) Similar Stainless Steel hinged doors and/or removable panels fitted with louvers shall also be furnished in areas of the cabinetry where certain types Food Service Equipment items are installed into the counter. Location and hinging of these louvered doors and/or removable panels shall be as shown on Food Service Design Drawings.

These louvers are to help expel excessive heat generated by the normal operation of these Food Service Equipment items from the cabinet interior.

IMPORTANT: The F.S.E.C. shall be responsible to insure that the final location, quantity, style, shape and overall size of each louvered door and/or panel will be sufficient to insure that proper ventilation will be provided for the intended Food Service Equipment item.

The F.S.E.C. is also required to determine if additional louvered doors and/or panels not originally shown on the Food Service Design Drawings would be required to provide the required ventilation.

If additional louvered doors and/or panels are required, the F.S.E.C. must clearly identify these items on their Custom

Fabrication Shop Drawings for approval by the Architect and/or Food Service Consultant.

5. ACCESS PANELS FOR STAINLESS COUNTERS:

- (a) When required and shown on Food Service Design Drawings, Stainless Base Cabinets shall be furnished with removable panels to allow for access to the cabinet interior for daily operation and/or maintenance and/or repair of certain types Food Service Equipment items are installed into the counter.
- (b) These panels shall be made easily removable for access to Utility Lines (i.e. Plumbing, Electric and Data Communication Lines) located within the counter interior whenever this is otherwise prevented through the opposite side or either end of the counter body.
- (c) Multiple adjacent exterior panels shall be of the same size and shape so as to appear continuous with adjacent surfaces.
- (d) Unless otherwise specified or shown on drawings, all removable panels shall be a minimum of 24 inches and a maximum of 36 inches in length and equal in length to any adjoining removable panels.
- (e) All removable panels shall be easily removable without the use of tools using concealed fasteners.

Removable panels shall be affixed to counter body in an approved manner using clips or other hardware designed for repeated removal. Unless otherwise specified, the use of screws and other permanent-type fasteners will not be acceptable.

- (f) All removable panels shall have the same stainless construction as hereinbefore specified for the adjacent stainless cabinetry.

N. HINGED MILLWORK DOORS SPECIFIED FOR STAINLESS STEEL CABINETS:

1. TYPICAL MILLWORK HINGED DOORS:

When specified, Millwork Hinged Doors shall be attached to stainless steel counter bodies in an appropriate manner with all required hardware as herein specified and shown on Food Service Design Drawings.

- (a) MILLWORK DOOR CONTRUCTION: All Millwork Hinged Doors shall be fabricated of the same Marine Grade Plywood as hereinbefore specified.
- (b) MILLWORK DOOR FINISHES: All Millwork Hinged Doors shall have matching exterior and/or interior surfaces of either H.P.L. or wood veneer as herein specified or shown on drawings.

2. MILLWORK DOORS & REMOVABLE PANELS FITTED WITH VENTILATION SLOTS:

- (a) All Millwork Hinged Doors and/or removable panels specified to enclose self-contained compressor compartments located within counter bodies shall be fitted with slots in millwork for ventilation. All as hereinafter specified or shown on drawings.
- (b) Similar Millwork hinged doors and/or removable panels fitted with slots in millwork for ventilation shall also be furnished in areas of the cabinetry where certain types Food Service Equipment items are installed into the counter. Location and hinging of these slots in doors and/or removable panels shall be as shown on Food Service Design Drawings.

These slots are to help expel excessive heat generated by the normal operation of these Food Service Equipment items from the cabinet interior.

IMPORTANT: The F.S.E.C. shall be responsible to insure that the final location, quantity, style, shape and overall size of each ventilated door and/or panel will be sufficient to insure that proper ventilation will be provided for the intended Food Service Equipment item.

- (c) The F.S.E.C. is also required to determine if additional ventilated doors and/or panels not originally shown on the Food Service Design Drawings would be required to provide the required ventilation.
- (d) If additional ventilated doors and/or panels are required, the F.S.E.C. must clearly identify these items on their Custom Fabrication Shop Drawings for approval by the Architect and/or Food Service Consultant.

O. VENTILATION FANS INSIDE STAINLESS STEEL COUNTERS:

- 1. In addition to furnishing Stainless Steel and/or Millwork Hinged Doors and/or removable panels with louvers for ventilation, the F.S.E.C. is also required to determine if additional ventilation may be required to expel excess heat from inside the counter interior thru the use of electric mini ventilation fans.

If the F.S.E.C. determines that they are required, these mini-electric ventilation fans shall be sized, furnished and installed by the Counter Fabricator in sufficient quantities to adequately expel excess residual heat produced by various drop-in and/or built-in Food Service-related equipment mounted within the cabinet body during their daily operation.

- 2. These fans shall be located inside the cabinet body in locations that will not (whenever feasible) impede the installation, maintenance and/or future repair of the counter itself or adjacent drop-in and/or built-in Food Service-related equipment

3. These fans shall be mounted and pre-wired to separate on/off switch(es) within the counter interior by the Counter Fabricator for final electrical connection by the Electrical Contractor in the Field.

IMPORTANT: Whenever feasible, the minimal electrical power required for these mini ventilation fans shall be taken from EITHER the power already being supplied from adjacent electrically powered Food Service Equipment located within the counter in question OR from existing electrical receptacles and/or junction boxes located within the counter that are not being utilized. The F.S.E.C. shall verify and coordinate this issue with the General Contractor and the Electrical Contractor.

4. These mini-ventilation fans shall be of a design to produce minimal noise while operating inside counters.

IMPORANT: Fan sound not to exceed 30 decibels during normal operation.

This Vendor will assist the Counter Fabricator in selecting and furnishing the proper quantity, manufacturer and model number of fan(s) that may be required.

6. The F.S.E.C. shall submit detailed information (i.e. manufacturer, model number, cut sheets, Photos, etc.) on each type fan to be furnished by their Counter Fabricator to the Architect, Food Service Consultant and all other Concerned Parties for their review and approval PRIOR the counters being fabricated as part of the Shop Drawing Review Process for this project.
7. Other sources of these type of mini ventilation fans may be used for this project once they are submitted by the F.S.E.C. and approved by all Concerned Parties.

2.05 CUSTOM FABRICATED MILLWORK EQUIPMENT:

A. MILLWORK CABINETS:

1. MILLWORK BASE CABINETRY: All Millwork Counter Base Cabinetry shall be fabricated in sizes and shapes as specified and shown on Food Service Design Drawings using Millwork Board and decorative materials as hereinbefore specified under Section 2.01 - Sub-Sections "I" thru "M".

All Custom Millwork Fabrication shall meet the specifications and guidelines of The Architectural Woodwork Institute (AWI) for quality standards.

Support structures and access space must be provided for the installation and operation of separate "drop-in" or "built-in" Food Service Equipment, related Control Devices, or other related components as specified and shown on Food Service Design drawings.

2. MILLWORK CABINET JOINERY: All Millwork Cabinetry shall be built using Butt Joint-type Construction.

All joints shall be fastened with a combination of screws and staples. In addition, Wood Glue shall be used at all wood-to-wood joints.

All field joints will comprise of double vertical panels connected using hex head bolt, washer and nut or all metal furniture connecting bolt systems (similar to CON-928 as manufactured by Outwater Hardware or approved equal).

Unless otherwise specified, Cabinetry to be built in lengths that support practicality of delivery and installation while minimizing field joints. Whenever necessary, all Field Joints must be tight, flush and in locations that will minimize visibility.

3. MILLWORK CABINET INTERIOR FINISH: Unless otherwise specified and shown on Food Service Design Drawings, all Millwork Cabinet interiors shall be furnished with Vertical Grade H.P.L. (High Pressure Laminate) or Melamine in a standard color identified by product number and name as specified by Architect and/or shown on drawings.
4. MILLWORK CABINET INTERIOR SHELVING: All Millwork Cabinet interiors shall be supplied with either fixed or adjustable and/or removable millwork shelves as specified and shown on Food Service Design Drawings.

All millwork shelves will be constructed using materials as hereinbefore specified. Unless otherwise specified, all shelves must be laminated with matching Interior H.P.L. to cover all visible surfaces.

5. MILLWORK CABINET TOE KICK BASES: Whenever Toe-Kick Bases are specified and shown on drawings (in lieu of supporting a cabinet on legs), base cabinets shall be supplied with a separate millwork base structure engineered to supply cross member supports and structure for final leveling and mounting of the Base Cabinet. In these instances, all Toe Kick Bases shall be constructed using Marine Grade Plywood as hereinbefore specified.

NOTE: The exterior surface of all Toe Kick Bases shall be either finished and/or left unfinished as specified or shown on Food Service Design Drawings. Those identified to be finished shall be constructed with decorative and protective materials as specified and shown on drawings.

6. LEGS FOR MILLWORK CABINETS: Whenever specified and shown on drawings, all Millwork Counters shall be supported on 6 inch high, heavy-duty stainless steel legs. Each leg shall be adjustable and affixed to underside of counter body in an approved manner spaced no more than 5'-0" apart.
7. MILLWORK CABINET VERTICAL EXTERIOR SURFACES: Unless otherwise specified and shown on Food Service Design Drawings, the exterior vertical surfaces of all Millwork Cabinetry including: exposed ends, cabinet frame edges (all vertical surfaces other than interior and toe bases) shall be finished as hereinbefore specified

8. TYPICAL MILLWORK CABINET HINGED DOORS: Whenever specified, Millwork Hinged Doors shall be attached to stainless steel counter bodies in an appropriate manner with all required hardware as herein specified and shown on Food Service Design Drawings.
- (a) MILLWORK DOOR CONSTRUCTION: All Millwork Hinged Doors shall be fabricated of the same Marine Grade Plywood. material as hereinbefore specified.
 - (b) MILLWORK DOOR FINISHES: All Millwork Hinged Doors shall have matching exterior and/or interior surfaces of either H.P.L. or wood veneer as herein specified or shown on drawings.

9. MILLWORK DOORS & REMOVABLE PANELS FITTED WITH VENTILATION SLOTS:

- (a) All Millwork Hinged Doors and/or removable panels specified to enclose self-contained compressor compartments located within counter bodies shall be fitted with slots in millwork for ventilation. All as hereinafter specified or shown on drawings.
- (b) Similar Millwork hinged doors and/or removable panels fitted with slots in millwork for ventilation shall also be furnished in areas of the cabinetry where certain types Food Service Equipment items are installed into the counter. Location and hinging of these slots in doors and/or removable panels shall be as shown on Food Service Design Drawings.

These slots are to help expel excessive heat generated by the normal operation of these Food Service Equipment items from the cabinet interior.

IMPORTANT: The F.S.E.C. shall be responsible to insure that the final location, quantity, style, shape and overall size of each ventilated door and/or panel will be sufficient to insure that proper ventilation will be provided for the intended Food Service Equipment item.

The F.S.E.C. is also required to determine if additional ventilated doors and/or panels not originally shown on the Food Service Design Drawings would be required to provide the required ventilation.

If additional ventilated doors and/or panels are required, the F.S.E.C. must clearly identify these items on their Custom Fabrication Shop Drawings for approval by the Architect and/or Food Service Consultant.

10. VENTILATION FANS INSIDE MILLWORK CABINETS: Shall be same as hereinbefore specified for Stainless Steel Counter Construction under SECTION 2.04, Sub-Section "O".

11. MILLWORK CABINET ACCESS PANELS:

- (a) When required and shown on Food Service Design Drawings, Millwork Base Cabinets shall be furnished with removable panels to allow for access to the cabinet interior for daily operation and/or maintenance and/or repair of certain types Food Service Equipment items are installed into the counter.
- (b) These panels shall be made easily removable for access to Utility Lines (i.e. Plumbing, Electric and Data Communication Lines) located within the counter interior whenever this is otherwise prevented through the opposite side or either end of the counter body.
- (c) Multiple adjacent exterior panels shall be of the same size and shape so as to appear continuous with adjacent surfaces.
- (d) Unless otherwise specified or shown on drawings, all removable panels shall be a minimum of 24 inches and a maximum of 36 inches in length and equal in length to any adjoining removable panels.
- (e) All removable panels shall be easily removable without the use of tools using concealed fasteners.

These removable panels shall be affixed to counter body in an approved manner using clips or other hardware designed for repeated removal. Unless otherwise specified, the use of screws and other permanent-type fasteners will not be acceptable.

- (f) All removable panels shall have the same millwork construction as hereinbefore specified for the adjacent millwork cabinetry.
- (g) All removable panels shall have matching exterior and/or interior surfaces of either H.P.L. or wood veneer as herein specified or shown on drawings.

B. ENGINEERED SOLID (QUARTZ) COUNTERTOPS & SPLASHES:

1. SOLID (QUARTZ) COUNTERTOP MATERIAL: Unless otherwise specified, any stainless steel millwork counter bases shown to have quartz-type man-made Engineered Stone tops shall have those countertops (and splashes) fabricated of material by the manufacturer selected for this Project.
2. SOLID (QUARTZ) COUNTERTOP CHARACTERISTICS: Whatever the specified material, all "solid" tops and splashes shall be furnished in sizes, shapes, colors and patterns in standard 3 cm thickness or as hereinafter specified and shown on drawings. Each top shall be furnished and installed by a Factory Authorized Dealer of this material.
3. SOLID (QUARTZ) COUNTERTOP MOUNTING: Each "solid" top and splash shall be affixed to the counter body below in an approved manner using color-coordinated seam adhesive and silicone. Each top shall

be supported using Millwork Cabinet Substrate, as hereinbefore specified or as otherwise instructed by the material manufacturer.

4. SOLID (QUARTZ) COUNTERTOP EDGES: All "solid" tops and splashes shall have all exposed edges finished in a matching "Eased-Type" Edge, unless otherwise specified and/or shown on drawings. All corners shall have matching radius edges.

All unexposed edges of tops and splashes shall be finished square and smooth. All edges meeting building walls or other partitions shall be scribed in the Field during installation to accommodate adjacent finished surface of wall or partition. Resulting "solid" edge(s) shall be sealed to walls or partitions using a matching, color-coordinated, approved seam adhesive, in an approved manner.

5. SOLID (QUARTZ) COUNTERTOP SEAMS: Any field seams required for Engineered Solid (Quartz) countertops shall be kept to a minimum. Solid (Quartz) tops wider than 52 inches shall have field seams. All seams shall be filled using color coordinated seam adhesive made for use with Solid (Quartz) material. All seams shall be as unnoticeable as possible from the adjacent surfaces in their finished state.
6. SOLID (QUARTZ) COUNTERTOP FABRICATION & INSTALLATION: Whatever the specified "solid" countertop or matching splash material, it shall be fabricated, installed and otherwise furnished in accordance with any and all instructions mandated by the specified manufacturer.

The F.S.E.C. assumes all responsibility in the furnishing and installing of this material in accordance with the manufacturer's guidelines for use in a Commercial and/or Institutional Food Service Facility.

The Architect and/or Food Service Consultant shall be notified immediately of any and all problems and/or issues encountered by the F.S.E.C. during their fabrication and installation of this "solid" top and splash material so a viable solution may be enacted.

7. CUT-OUTS & OPENINGS IN SOLID (QUARTZ) COUNTERTOPS:

- (a) CUT-OUTS: Top and interior body of counter to be cut out and have any other openings, as required, to accept any and all "Buy-Out" Food Service Equipment and related components as hereinafter specified. All "cut outs" and openings shall be finished in an approved and safe manner so as to prevent injury.

Stone (Quartz) material to be cut with rounded corners to prevent cracking.

IMPORTANT: Unless otherwise directed, The F.S.E.C. shall coordinate and confirm that all related Food Service Equipment will be shipped to Millworker's Fabrication Shop to be pre-fitted into each corresponding counter opening PRIOR to each counter leaving shop and/or being installed at the Jobsite.

- (b) ROUND PENETRATIONS FOR UTILITY LINES: Unless otherwise specified or shown on drawings, all penetrations in counter tops required to vertically run Utility Lines (i.e. Plumbing, Electric and Data Communication Lines) shall consist of round holes fitted with color coordinated rubber or plastic grommets. F.S.E.C. to properly size all required holes.

Whenever possible, each hole with grommet shall be positioned in a concealed location that prevents obvious viewing by Workers and Patrons.

Solid Surface material to be cut with rounded corners to prevent cracking.

C. MILLWORK WALL CABINETS:

1. Custom Millwork Wall Cabinets shall be of length and configuration as shown on drawings or hereinafter specified. Typically, these cabinets shall measure 13 inches deep x 30 inches high, (except if otherwise specified or shown on drawings).
2. Construct cabinets of typical millwork fabrication, as hereinbefore specified. Exterior bottoms shall be of flush construction. All cabinets shall have sloped, dust-proof tops.
3. All "open-style" Wall Cabinets shall be of rectangular box construction with enclosed rear and ends. Each cabinet shall be provided with a fixed bottom shelf and either fixed or removable and adjustable intermediate interior shelves (as hereinafter specified and shown on drawings).
4. All removable and adjustable intermediate interior cabinet shelves shall be of similar construction as hereinafter specified for shelves located inside millwork counters.

Unless otherwise specified or shown on drawings, each intermediate shelf shall be supported by four (4) stainless steel keyhole-type pilasters, as hereinafter specified. Each pilaster shall be fastened to interior of cabinet in lengths as required, with matching snap-in shelf supports (tabs).

5. Wall Cabinets specified with doors shall be of rectangular box construction with enclosed rear and ends and have either hinged or sliding millwork doors.
6. All hinged or sliding millwork doors for custom wall cabinets shall be fabricated in the same manner and furnished with the same hardware (i.e. handles, locks, hinges, etc.) as similar doors hereinafter specified for Millwork Counters.
7. General Contractor shall furnish and install Wall Blocking required to support all wall cabinets. All Wall Blocking shall be of appropriate size, shape and material as hereinafter specified and shown on Food Service Design Drawings. This blocking shall be

mounted within building walls and concealed from view by the selected wall finish material.

2.06 TRAYSLIDES (WHEN SPECIFIED):

A. STAINLESS STEEL TRAYSLIDES:

1. STAINLESS STEEL TRAYSLIDES: Shall be of size, shape and design as hereinafter specified and shown on Food Service Design Drawings.
2. Typically, the flat surface of all trayslides shall be 2'-10" above finished floor, unless otherwise specified or shown on drawings.
3. Stainless trayslides shall be fabricated of either flat sheets or tubular stainless steel and finished for Patrons in a sanitary and safe manner. Actual design shall be as hereinafter specified and shown on drawings.
4. Unless otherwise specified, stainless trayslides shall be fastened to counter body in an approved manner using horizontal stainless steel members equally spaced and concealed beneath trayslide itself so that these trayslide supports will be unseen by Patrons.

Cantilever or any other type brackets exposed to view will not be acceptable.

5. Stainless trayslide ends shall be finished in an approved manner (both when they are open to view and/or when they are adjacent to building walls or partitions).
6. Any field seams required for stainless trayslides shall be kept to a minimum. All seams shall be fully welded ground and polished smooth as hereinbefore specified. All seams shall be as unnoticeable as possible from the adjacent surfaces in their finished state.
7. All unexposed edges of stainless trayslides shall be finished square and smooth. Resulting stainless edge(s) shall be sealed to adjacent counter top edge(s) using matching color-coordinated silicone sealant, in an approved manner.
8. All stainless steel trayslide ends meeting building walls or other partitions shall be scribed in field during installation to accommodate adjacent finished surface of wall or partition. Resulting stainless edge(s) shall be sealed to walls or partitions using matching, color-coordinated silicone sealant, in an approved manner.

2.07. KICKPLATES (WHEN SPECIFIED) :

A. STAINLESS STEEL KICKPLATES:

1. Whenever specified for either Stainless Steel or Millwork (Wooden Frame) Counters, all Stainless Steel Kickplates shall be constructed of #18 gauge stainless steel, with full-length radius cove along outside bottom edge. Each kickplate shall also have hemmed edge along full-length of inner top edge and inside edge of both ends.
2. Should kickplate be specified or shown on drawings to be curved, it shall be affixed to a Marine Grade Plywood backer for extra rigidity (in lieu of a radius hemmed edge).
3. Each Stainless Steel Kickplate shall be easily removable for cleaning and access to underside of Serving Counter. Each kickplate shall be a maximum of 6'-0" in length for easy handling.
4. Each Stainless Steel Kickplate shall be attached to the underside of Serving Counter with heavy-duty stainless steel angle brackets and would be adjustable using a set screw as shown on Section Details on Food Service Design Drawings.

This set screw shall be pushed through vertical slots fabricated toward the top edge of kickplate so kickplate can be made level with the finished adjacent Finished Floor surface. The head of the set screw shall be hidden from view at a distance by the exterior fascia panel of the counter body.

5. All Stainless Steel Kickplates shall be furnished with an approved spray-on type sound deadening material applied to the rear surface for noise reduction from accidental kicking during daily use.

B. MILLWORK KICKPLATES:

1. Whenever specified for Millwork (Wooden) Counters, all Millwork Kickplates shall be constructed of structural-grade Marine Grade Plywood material in size and shape as shown on Food Service Design Drawings.
2. All Millwork Kickplates shall be furnished with full-length protective vinyl toe-kick material (of manufacturer and model number as selected for this project) with radius cove with cove along bottom cemented to outside face of kickplate, unless otherwise specified and shown on drawings.
3. Each Millwork Kickplate shall also have top edge and both ends finished in same plastic laminate finish as counter body. Wherever (2) ends would meet end-to-end, each end shall be mitered to fit with adjoining end in a matching reverse configuration.
4. Each Millwork Kickplate shall be easily removable for cleaning and access to underside of Serving Counter. Each kickplate shall be a maximum of 6'-0" in length for easy handling.

5. Each Millwork kickplate shall be attached to the underside of Serving Counter with heavy-duty stainless steel angle brackets and would be adjustable using a set screw as shown on Section Details on Food Service Design Drawings.

This set screw shall be pushed through vertical slots fabricated toward the top edge of kickplate so kickplate can be made level with the finished adjacent Finished Floor surface. The head of the set screw shall be hidden from view at a distance by the exterior fascia panel of the counter body.

2.09 HANDLES, BRACKETS, HARDWARE, LOCKING DEVICES & CASTERS:

A. GENERAL HARDWARE SPECIFICATIONS:

1. **HARDWARE FINISH:** Wherever Food Service Equipment is provided with handles, knobs, hinges, brackets or other miscellaneous hardware, all shall be either satin finish stainless steel or chrome plated, unless otherwise specified.
2. **HANDLE TYPE:** All pull handles to be of the full-grip type, unless otherwise specified.
3. **STAINLESS STEEL DOOR HINGES & CATCHES:**
 - (a) All custom fabricated Stainless Steel hinged doors shall be provided with stainless steel lift-off type or piano-type hinges and adjustable tension type catches, as hereinafter specified and shown on Food Service Design drawings.
 - (b) Unless otherwise specified, each stainless steel hinge shall be fully mortised into doors and corresponding counter mullions to create a flush, clean appearance.
 - (c) Magnetic-type catches for custom fabricated Stainless Steel hinged doors shall not be acceptable.
4. **MILLWORK DOOR HINGES & CATCHES:**
 - (a) All custom fabricated Millwork hinged doors to be furnished with heavy-duty, adjustable, concealed cabinet hinges and catches as hereinafter specified and shown on Food Service Design drawings or Architectural Design drawings.
 - (b) Unless otherwise specified, each millwork door hinge shall be installed to be generally concealed from exterior view (according to the hinge Manufacturer's instructions) to create a flush, clean appearance.
 - (c) Magnetic-type catches for custom fabricated Millwork hinged doors shall not be acceptable (unless otherwise specified and shown on Food Service Design drawings or Architectural Design drawings).

NOTE: Unless otherwise specified or shown on drawings, catches for Millwork hinged doors may be omitted if the cabinet hinges being furnished are of semi-self-closing type that will eliminate the need for a door catch.

B. GENERAL SPECIFICATIONS FOR LOCKING DEVICES:

1. CYLINDER LOCKS:

- (a) APPLICATIONS: All sliding and hinged doors and all drawers in tables, cabinets, storage bins, reach-in, worktop and/or undercounter-type refrigerators, freezers and/or heated cabinets shall be furnished with extra heavy-duty, security-type cylinder locks.
- (b) EXTERIOR FINISH: The outside face of each cylinder lock shall be either chrome plated, a brushed satin finish or another specified finish color-coordinated to match the corresponding adjacent finish of the material to which it will be installed.
- (c) CYLINDER LOCK KEYING: Architect and/or Food Service Operator to verify with Owner as to their preferred keying of all cylinder locks.

2. PADLOCKS: For those Food Service Equipment Items where locking devices are requested but cylinder locks are not feasible, provisions for a padlock shall be provided as part of the finished design.

NOTE: All padlocks shall be furnished by the Owner or Food Service Operator (unless otherwise specified or shown on Food Service Design Drawings).

C. GENERAL SPECIFICATIONS FOR CASTERS:

- 1. When specified, casters for all mobile tables, stainless steel equipment stands, shelving units and/or Custom Millwork Units shall be provided with heavy-duty casters; (plus brakes when noted).
- 2. CASTERS FOR FOOD SERVICE ITEMS: All casters for standard manufactured and/or custom fabricated Food Service Equipment Items shall be 5 inches in diameter (unless otherwise specified or required for a specific application).
- 3. CASTERS FOR MILLWORK ITEMS: All casters for custom fabricated Millwork Food Service Equipment Items shall be in various diameters as hereinafter specified or required for a specific application.

D. CUSTOM STAINLESS STEEL CABINET HARDWARE:

- 1. HANDLES FOR STAINLESS STEEL DOORS: Each shall be full grip-type stainless steel pull handle measuring 4 inches long x 5/8 inch wide with brushed satin finish. Model #P46-1012 as manufactured by Component Hardware Group, or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

2. HINGES FOR STAINLESS STEEL DOORS: Each shall be Model # R76-1000 stainless steel concealed pivot-type hinges for use on either single thickness or double pan insulated stainless steel hinged doors, as manufactured by Component Hardware Group ,or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

These type hinges have oblong mounting holes to permit easy door adjustment. In addition, each set of two (2) hinge brackets (required for each hinged door) has a self-lubricating bronze pivot bushing with a removable pivot pin that would allow door to be removed with the need to disassemble either bracket.

3. CATCHES FOR STAINLESS STEEL DOORS: Each shall be Model # M22-2420 (standard duty) door catch with adjustable spring-loaded ball tension feature designed for use on either single thickness or double pan insulated stainless steel hinged doors, as manufactured by Component Hardware Group, or approved equal (unless otherwise specified or shown on drawings).

NOTE: In the event that oversized (i.e. extra high or otherwise large) hinged doors are specified and shown on drawings, a similar Model # M22-2430 (Heavy duty) door catch by Component Hardware Group, or approved equal shall be furnished.

4. CYLINDER LOCKS FOR STAINLESS STEEL DOORS & DRAWERS:

- (a) HINGED DOOR LOCKS: Each shall be Model # P-30 Series cylinder-type lock for use on either single thickness or double pan insulated stainless steel hinged doors, as manufactured by Component Hardware Group or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

NOTE: Actual model number varies based on actual door width.

- (b) SLIDING DOOR LOCKS: Each shall be Model # P20-0490 plunger-type lock for use on single thickness or double pan insulated stainless steel sliding doors, as manufactured by Component Hardware Group or approved equal (unless otherwise specified or shown on Food Service Design Drawings).
- (c) DRAWER LOCKS: Each shall be Model # P10-0370 cylinder-type lock for use on stainless steel drawers as manufactured by Component Hardware Group or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

5. SLIDES FOR STAINLESS STEEL DRAWERS: Each shall be full extension-type stainless steel N.S.F. Listed drawer slides. Model # S26 series as manufactured by Component Hardware Group, or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

Typically, all utility (i.e. utensil) drawers shall be furnished with heavy duty removable thermoplastic liner pan measuring 20" x 20" x 5" deep to fit into a corresponding drawer size or shown on drawings). Each shall be Model # S80-2020 as manufactured by Component Hardware Group, or approved equal.

When required, smaller drawers shall be furnished with similar 15" x 20" x 5" deep thermoplastic pans, also as manufactured by Component Hardware Group.

Alternately, heavy-duty stainless steel drawer pans by Component Hardware Group shall be furnished in these same sizes whenever specified or shown on Food Service Design Drawings.

6. STAINLESS STEEL SLIDING DOOR HARDWARE: Each custom stainless steel sliding door shall be fabricated as hereinbefore specified and furnished with all necessary hardware as manufactured by Component Hardware Group, or approved equal.
7. SUPPORTS FOR ADJUSTABLE STAINLESS STEEL SHELVES: Each shall be keyhole-type pilasters in lengths as required. Model # T21-1 Series stainless steel pilasters with matching snap-in shelf supports (tabs), all as manufactured by Component Hardware Group, or approved equal (unless otherwise specified or shown on Food Service Design Drawings).

E. CUSTOM MILLWORK CABINET HARDWARE:

1. HANDLES FOR MILLWORK DOORS: Each shall be full grip-type wire pull handle measuring 4 inches long x 7mm in diameter with brushed chrome steel finish. Model # 116-09-617 as manufactured by Hafele USA, or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).
2. HINGES FOR MILLWORK DOORS: Each shall be a fully concealed self closing-type cabinet hinge with nickel-plated finish. Each hinge shall have a 100 degree opening angle and a three-dimensional adjustment feature. Model # 71M2580 as manufactured by Blum, Inc., or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).

NOTE: In the event that a free-swing-type (non-self-closing) millwork hinged door is specified or shown on drawings, a similar Model # 71M2580-TL door hinge by Blum, Inc., or approved equal shall be furnished.

3. CYLINDER LOCKS FOR MILLWORK DOORS: Each shall be disc tumbler cam-type cylinder lock. Model # C8060-C415A-14A as manufactured by Compex National (a/k/a National Cabinet Lock) or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).
4. SLIDES FOR MILLWORK DRAWERS: Each shall be full extension, steel ball bearing-type slide with 100 pound capacity. Model # 3800 Series as manufactured by Accuride International or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).
5. SUPPORTS FOR ADJUSTABLE MILLWORK SHELVES: Each shall be flat tab (shovel) type metal support pin measuring 5 mm in diameter with nickel-plated finish. Model # 282-04-711 as manufactured by Hafele USA, or

approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).

6. MILLWORK CASTERS: Each shall be an N.S.F. Certified, heavy-duty, swivel plate caster with Delrin-type bearings fabricated of grey rubber on polypropylene wheel with flat tread, measuring 4 inches high x 1-1/4 inches wide with 300 pound capacity.

Model # 2702T22 (swivel - no brake) and/or Model # 2702T82 (swivel - with brake) as supplied by McMaster Carr or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).

7. MILLWORK DOWELS: When specified, all millwork dowels shall be a pre-glued Hardwood Fluted Beech Dowel (A.W.I. Premium Grade) measuring 8mm in diameter x 30mm long or approved equal (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).

NOTE: All of the above Food Service-related hardware components shall be furnished and installed (as required) by Food Service Equipment Contractor (unless otherwise specified or shown on Food Service Design Drawings or Architectural Design Drawings).

2.10 ELECTRICAL MOTORS, HEATING ELEMENTS & PORTABLE ELECTRICAL EQUIPMENT:

A. ELECTRICAL MOTORS:

1. In general, electrical motors for Food Service Equipment shall be of the drip-proof, splash-proof, or totally enclosed type having a two hour duty cycle and ball bearings (except small timing motors, which may have sleeve bearings). All motors shall have windings impregnated to resist moisture.
2. Motors shall have ample power to operate machinery for which designated, under full load operating conditions, without exceeding nameplate ratings.
3. Fractional horsepower motors 1/2 HP and above shall be supplied to operate on 208 volts, 3 phase, 4 wire, and shall be provided with a magnetic pushbutton.
4. Motors 1/3 HP and under shall be 120 volt 60 cycle, single phase, provided with a manual starting switch with thermal overload.

Unless these motors shall be used for devices requiring automatic operation, in which case they shall be magnetic type with manual reset.

B. ELECTRICAL HEATING ELEMENTS:

1. In general, wherever heating elements are required for operation of Food Service Equipment, each separate heating element shall be interconnected with a switch and pilot light.
2. Where a single element has a three setting, the switch shall have a multiple setting, consisting of (at least) high, medium, low and off positions.

C. PORTABLE ELECTRICAL FOOD SERVICE EQUIPMENT:

1. In general, all portable Food Service Equipment shall be furnished with a factory-supplied cord with NEMA plug attached.

In the event a NEMA plug is not furnished standard with the unit, an appropriate one sized and authorized by the equipment manufacturer shall be furnished and installed in Field by Electrical Contractor.

2. Typically, electrical cords for portable Food Service Equipment shall have a ground wire and a polarized NEMA plug approved for use with the corresponding type of electrical receptacle required for proper installation and operation of the equipment.

NOTE: All Electrical Requirements noted above shall be adhered to unless otherwise specified or shown on Food Service Design Drawings.

2.11 FAUCETS, VALVES & FITTINGS RELATED TO FOOD SERVICE EQUIPMENT:

A. FAUCETS, VALVES AND FITTINGS shall be as follows, unless otherwise specified or shown on Food Service Design Drawings:

1. FAUCETS: Unless otherwise specified, faucets shall be furnished for all Food Service-related sinks.

Unless otherwise specified, all faucets shall be as manufactured by FISHER MANUFACTURING COMPANY, or an approved equal, as follows:

(a) Faucets for KITCHEN and/or WAREWASHING AREAS:

- | | |
|---|------------------------------------|
| 1. For Stainless Steel Work Sinks | Model No. 3253
(Splash-Mounted) |
| 2. For Stainless Steel Work Sinks | Model No. 3313
(Deck-Mounted) |
| 3. For Stainless Steel Bain-Marie Sinks | Model No. 3010
(Deck-Mounted) |

(b) Faucets for SERVERY and/or PANTRY AREAS:

- | | |
|---|---|
| 1. For Utility Sinks in Stainless Steel Countertops | Model No. 26166
(Deck-Mounted) |
| 2. For Utility Sinks in Stainless Steel Countertops | Model No. 26344
(Splash-Mounted) |
| 3. For Utility Sinks in "Solid Surface" Countertops | Model No. 26166-MOD
(Deck-Mounted) |
| 4. For Utility Sinks in "Solid Surface" Countertops | Model No. 26344-MOD
(Splash-Mounted) |
| 5. For Hand Sinks in Stainless Steel Countertops | Model No. 26220
(Deck-Mounted) |

- | | |
|--|---|
| 6. For Hand Sinks in Stainless Steel Countertops | Model No. 26263
(Splash-Mounted) |
| 7. For Hand Sinks in "Solid Surface" Countertops | Model No. 26220-MOD
(Deck-Mounted) |
| 8. For Hand Sinks in "Solid Surface" Countertops | Model No. 26263-MOD
(Splash-Mounted) |

(c) WRIST ACTION HANDLES FOR HAND WASH SINK FAUCETS:

Whenever required to meet specific Health Code Requirements, faucets for Hand Wash Sinks built into tables and/or counters shall be fitted with Wrist Action Handles, Model # 3984-230, as manufactured by FISHER MANUFACTURING COMPANY, or an approved equal.

(d) Faucets for MISCELLANEOUS FOOD SERVICE AREAS:

Unless otherwise specified, all faucets located in miscellaneous Food Service-related areas not mentioned above shall be as manufactured by FISHER MANUFACTURING COMPANY, or an approved equal.

2. WORK SINK WASTE (OUTLET) VALVES: Unless otherwise specified, waste (outlet) valves shall be furnished for all Food Service-related work sinks.

Each sink compartment (including Bain-Marie type sink compartments but excluding all Hand Wash Sinks) shall be provided with a waste outlet valve.

Unless otherwise specified, each waste outlet shall be a twist-handle type valve furnished complete with a matching overflow tube and strainer fitting mounted to the back wall of the sink basin.

All twist waste outlet valves with overflows shall be Model # 24902, as manufactured by FISHER MANUFACTURING COMPANY, or an approved equal.

Each waste outlet valve for work sinks shall measure 2 inches in diameter (unless otherwise specified or shown on Food Service Design Drawings).

3. HAND SINK DRAIN OUTLETS: Each Hand Wash Sink shall be furnished with a free-flowing-type drain outlet fitted with a strainer plate to prevent the ability to hold water in the sink basin.

Unless otherwise specified, waste outlets for all Custom Fabricated stainless steel Hand Wash Sinks built into counters shall be Model # E18-1822 duo basket drain fitted with E18-1850 flat strainer drain accessory, all as manufactured by Component Hardware, or an approved equal.

NOTE: All Standard Manufactured ("Buy-Out") Hand Wash Sinks hereinafter specified shall be furnished with a similar type flowing-type drain outlet with strainer

NOTE: Any Hand Wash Sinks fitted with lever or twist-type waste valves that would hold water will not be accepted.

Each drain outlet for Hand Wash Sinks shall measure 1-1/2 inches in diameter (unless otherwise specified or shown on Food Service Design Drawings).

4. WAREWASHING MACHINE VALVES & RELATED DEVICES: When required and unless otherwise specified, all Commercial-grade Food Service Warewashing machines shall be furnished with the following plumbing fixtures:

(a) PRESSURE REGULATOR VALVE:

1. Valve shall be set for twenty pounds discharge pressure. Valve shall be self-regulating and shall have a manual adjustment range between 15-30 pounds (all unless otherwise specified).
2. Valve bodies and working parts shall be made of brass.

IMPORTANT: If this valve is not furnished by F.S.E.C. from the Warewashing Machine Manufacturer as part of their detailed equipment specification (as hereinafter noted), then it shall be properly sized, furnished and installed by the Plumbing Contractor (in coordination with the F.S.E.C.).

(b) ANTI-WATER HAMMER DEVICE:

1. Provide an approved device consisting of synthetic rubber chamber cased in steel housing.

NOTE: Devices utilizing air chambers or coiled copper tubing shall not be accepted.

IMPORTANT: If this device is not furnished by F.S.E.C. from the Ware Washing Machine Manufacturer as part of their detailed equipment specification (as hereinafter noted), then it shall be properly sized, furnished and installed by the Plumbing Contractor (in coordination with the F.S.E.C.).

(c) STEAM PRESSURE REDUCING VALVES:

1. The Plumbing Contractor shall properly size, furnish and install all Steam Pressure Reducing Valves (as required) for all Ware Washing Machines and related equipment (unless otherwise specified and noted on Food Service Design Drawings)
2. These valves shall be sized, located and installed in accordance with the Manufacturer's Installation Guidelines for their equipment.

NOTE: The final location of these valves shall be coordinated between the F.S.E.C. and the Plumbing Contractor PRIOR TO INSTALLATION to avoid any conflicts with inappropriately locating the valves on or near the equipment.

(d) GAS SOLONOID VALVES FOR COOKING EQUIPMENT:

1. The F.S.E.C. shall properly size and furnish all Gas Solenoid Valves required for Cooking Equipment to the General Contractor for installation by the Plumbing and Electrical Contractors (unless otherwise specified and noted on Food Service Design Drawings).
2. These valves shall be sized, located and installed in accordance with the Manufacturer's Installation Guidelines for their equipment.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS:

A. INSPECTION:

1. Prior to all work of this Section, The Food Service Equipment Contractor shall visit the Jobsite to carefully inspect the installed work of all other Building Trades and verify that all such work is complete to the point where installation of all Food Service-related equipment and/or furniture and fixtures included in this Section may properly commence.

Should the F.S.E.C. determine that delivery and/or installation of these items cannot yet commence, they shall immediately notify the appropriate Parties involved (i.e. General Contactor, Architect, Food Facilities Designer and/or the Owner, etc.) to resolve all outstanding issues contributing to that determination.

2. The F.S.E.C. shall also confirm that proper access at the Jobsite and within the confines of the building(s) to the intended rooms or spaces will be available to permit the delivery and/or installation of these items in an unobstructed and timely manner.

B. DISCREPANCIES:

1. In the event of any discrepancy involving Food Service-related equipment and/or furniture and fixtures covered under this Section, The F.S.E.C. shall immediately notify the appropriate Parties involved (i.e. General Contactor, Architect, Food Facilities Designer and/or the Owner, etc.).
2. The F.S.E.C. shall not proceed with installation in any areas of discrepancy until all such discrepancies have been fully resolved.

3.02 INSTALLATION:

- A. The installation and erection of any and all Food Service-related equipment and/or furniture and fixtures covered under this Section shall be performed under the supervision of an Approved Representative of the F.S.E.C. and in strict accordance with the specifications and the approved printed directions of the various Food Service and/or other Equipment Manufacturers involved.

- B. The F.S.E.C. shall also coordinate with the General Contactor to insure that their delivery and/or installation of these items coincides with the related work of other Building Trades who may be required to complete the installation of these same items.

3.03 PROTECTION OF WORK:

- A. For the period during which other Building Trades shall be on or near equipment, furniture, fixtures and/or Trade Work covered by this Section, the General Contractor shall cover and otherwise protect the exposed surfaces of such items. This protection shall be done in a manner that shall preclude injury to the finish of these items by absorption of oil, grease, chemicals, etc., contact from tools and machinery, and from all other causes which may be incidental to this and any other work being performed in the area.
- B. Should the General Contractor fail to protect these items and related Trade Work in the specified manner, they shall absorb all expenses for repairing and/or replacing this equipment and/or furniture and the need to un-install and/or re-install these items and/or perform any related Trade Work again.

3.04 CLEANING:

- A. When all the work covered by this Section, together with the work of other Building Trades has been completed, the Food Service Equipment Contractor shall clean each and every related equipment, furniture and/or fixture item so that all traces of grease, stains, protective coatings, abrasive dust, markings, scratches and other foreign matter are completely removed.
- B. All shipping materials to be discarded shall be done so as directed by the General Contractor in accordance with guidelines explained in the Construction Contract for work of this Section.
- C. The cleaning process shall be one, which shall eliminate any further cleaning on the part of the Owner with the exception of that which would ordinarily be undertaken daily to maintain accepted standards of sanitation and appearance.

3.05 TESTING & START-UP OF EQUIPMENT & FIXTURES:

- A. Initial tests and operational "start-up" of all related equipment and/or fixtures covered by this Section shall be performed in the presence of the Authorized Representative of the respective Manufacturers involved under the direction and coordination of the F.S.E.C.
- B. All defects disclosed by the tests and start-up of these units shall be eliminated to the satisfaction of the F.S.E.C. and the Owner and the corrected units retested until proper operation of each unit is achieved.
- C. The F.S.E.C. shall make available all necessary Service Technicians and/or Manufacturer's Representatives, materials, and/or equipment required to conduct these tests and/or operational "start-up" procedures.

D. Each test and/or start/up shall be done in a timely manner so as not delay the overall operation of the Facility.

E. Upon successful completion, a written and dated report shall be furnished by the F.S.E.C. to the Owner showing the Schedule of Testing, date, and results of each test and/or start/up.

3.06 WARRANTY REPAIRS OF EQUIPMENT, FURNITURE & FIXTURES:

A. GENERAL WARRANTY REPAIRS:

1. Unless otherwise specified, all related equipment furniture and/or fixtures included in this Section shall be provided with Warranty Repair Service at no cost to the Owner by the F.S.E.C. for a period of one (1) year after final acceptance of the work space.

2. This Warranty Repair Service shall also include adjustment (as required) for proper operation of all equipment involved.

It shall also include repair or replacement of any electrical and mechanical parts for these units whenever this is determined during this Term of Service.

3. Only genuine, standard replacement parts produced and/or authorized by the manufacturer of these units shall be used.

4. Any repairs, as necessary, due to ordinary wear and tear, shall be included as part of this Term of Service.

5. All work under this Warranty Repair Service shall be performed by competent authorized Service Personnel under the Manufacturer's supervision.

6. This work shall be done during Regular (Weekday) Working Hours and Days, but local Call-Back Emergency Service shall be available at all times.

B. WARRANTY REPAIRS FOR REFRIGERATION SYSTEMS:

1. Unless otherwise specified, Local Warranty Repair Service, on a twenty-four hour, seven (7) day call basis, at no additional cost to the Owner, shall be provided by the F.S.E.C. for a period of one (1) year from date of initial start-up of all Food Service-related Refrigeration Systems included in this Section.

2. A Representative of the authorized, Local Service Company shall be present at a start-up and adjustment of the various Food Service Refrigeration Systems and shall become thoroughly familiar with the requirements and characteristics of each system.

3. In addition to the above, all hermetically sealed refrigeration units shall be furnished with a warranty for a period of five (5) years from after final acceptances and installation.

3.07 EQUIPMENT DEMINSTRATIONS & OPERATION / MAINTENANCE / PARTS DATA:

A. EQUIPMENT DEMONSTRATIONS:

1. Properly trained, authorized personnel shall demonstrate to the Facility Food Service Staff the proper operation and required Maintenance Procedures of all Food Service-related equipment (including Refrigeration Systems) hereinafter specified.
2. All Equipment Demonstrations shall be pre-scheduled and conducted by an Authorized Representative of the respective Manufacturers involved under the direction and coordination of the F.S.E.C.

B. EQUIPMENT OPERATION/ MAINTENANCE/PARTS DATA:

1. Unless otherwise specified, four (4) complete printed copies of the instructions shall be furnished to the Owner, by the F.S.E.C. covering the operation and maintenance of all Food Service-related equipment, furniture and/or fixtures included in this Section.

This information shall be submitted in the following manner as hereinafter described for initial review by the Food Service Consultant, prior to use by the Owner:

2. A covered, bound booklet containing Manufacturer's current printed Installation / Operation / Maintenance / Parts manuals for all Food Service -related mechanically operated equipment hereinafter specified (including all accessories, components, faucets, etc.). Each manual shall be clearly labeled with their respective Equipment Item Number designation as hereinafter specified.
3. Booklet shall include a Table of Contents numerically listing each Equipment Item included within the booklet, complete with corresponding Item Number, Quantity and Description as hereinafter specified.
4. Booklet shall also include a Service Agency Listing. This listing shall include the complete name, street address and phone number of the local Service Agency for all equipment included within the booklet.

3.08 BUILDING MECHANICAL SERVICES RELATING TO FOOD SERVICE EQUIPMENT:

A. PLUMBING RELATED ISSUES:

1. BUILDING WATER PRESSURE, HOT WATER TEMPERATURE & DRAINAGE:

- (a) The Plumbing Contractor shall confirm (in writing) to the F.S.E.C. (and any other Concerned Parties) that the new and/or existing incoming building water pressure, hot water temperature and/or drainage receptacles and sanitary lines, etc. will be adequate for all mechanically operated Food Service Equipment hereinafter specified and shown on the Food Service Design Drawings.

- (b) These Building Plumbing Utilities shall permit all Food Service Equipment items (including Ware Washing Machines and related equipment) to operate in accordance within the Manufacturer's operational guidelines for proper and sustained performance.

IMPORTANT: If these Plumbing Utilities are found to be not adequate, the ordering and/or installation of any affected Food Service Equipment items by the F.S.E.C. shall not take place until all related issues are resolved by the Plumbing Contractor (and any other Building Trades that may also be involved).

2. FLOOR TROUGHS & RELATED DRAINS:

- (a) All specified floor troughs or floor sinks located in front of Tilting Kettles and/or Skillets must be positioned in such a manner so as to fall within the "pour pattern" required for those Cooking Equipment items.

The F.S.E.C. shall coordinate and confirm this issue with Architect, General Contractor and all applicable Building Trades PRIOR to the installation of these waste receptacles and their corresponding sanitary waste lines.

- (b) Unless otherwise specified and shown on Food Service Design Drawings, all specified floor troughs for Food Service-related Equipment items shall be furnished by the F.S.E.C. for installation by the Plumbing Contractor.

The Plumbing Contractor shall coordinate with the General Contractor to insure that they provide proper-sized openings and depressions in the building floor to accommodate each specified floor trough. The F.S.E.C. shall not be in any way responsible for these required floor openings and depressions.

3. FILTERED WATER FOR FOOD SERVICE EQUIPMENT ITEMS:

- (a) Unless otherwise specified and shown on Food Service Design Drawings, all water filters recommended and/or required for specific Food Service-related Equipment items (i.e. ice machines, steam operated equipment, beverage equipment, etc.) shall be furnished by the F.S.E.C. for installation by the Plumbing Contractor.
- (b) In the event specific Food Service-related Equipment items are furnished and installed by someone other than the F.S.E.C., the Plumbing Contractor shall then be responsible to properly size, locate, furnish and install water filters for each unit in accordance with the unit Manufacturer's recommendations.
- (c) All water filters shall be located so that they do not obstruct or otherwise interfere with the proper operation of any equipment items to which they may be adjacent to.
- (d) All water filters shall be located so as to permit easy inspection for proper operation, any necessary maintenance and/or repairs (to

themselves and/or the equipment to which they are serving) and frequent replacement of the filter cartridges.

B. ELECTRICAL RELATED ISSUES:

1. BUILDING ELECTRICAL INFRASTRUCTURE:

- (a) The Electrical Contractor shall confirm (in writing) to the F.S.E.C. (and any other Concerned Parties) that the new and/or existing building electrical power lines, breaker panels, junction boxes and/or wall and floor receptacles, etc. will be adequate for all mechanically operated Food Service Equipment hereinafter specified and shown on the Food Service Design Drawings.
- (b) These Building Electrical Utilities shall permit all Food Service Equipment items (including Exhaust Hoods and related equipment) to operate in accordance within the Manufacturer's operational guidelines for proper and sustained performance.

IMPORTANT: If these Electrical Utilities are found to be not adequate, the ordering and/or installation of any affected Food Service Equipment items by the F.S.E.C. shall not take place until all related issues are resolved by the Electrical Contractor (and any other Building Trades that may also be involved).

2. LIGHT FIXTURES IN FOOD SERVICE-RELATED AREAS:

- (a) Unless otherwise specified or stated on any Contract Drawings for this Project, the Electrical Contractor shall be responsible for all issues relating to any new or existing interior or exterior light fixtures located within the Food Service-related rooms or areas of this Project.
- (b) Except for specific lighting fixtures which may be hereinafter specified by the F.S.E.C. and shown on the Food Service Design drawings, the F.S.E.C. shall not be held responsible for any issues involving any new or existing overhead room or area lighting, task lighting, Emergency Lighting, outdoor lighting fixtures, etc. to any Food Service-related Equipment specified for this Project.
- (c) Electrical Contractor shall insure that all lighting fixtures, which may be hereinafter specified by the F.S.E.C., meet all current prevailing National, State and/or Local Codes.

C. H.V.A.C. RELATED ISSUES:

1. BUILDING H.V.A.C. INFRASTRUCTURE:

- (a) The Heating Ventilation & Air Conditioning Contractor shall confirm (in writing) to the F.S.E.C. (and any other Concerned Parties) that the new and/or existing building Ventilation Systems (i.e. exhaust & supply ductwork and fans and Fire Suppression and/or building Alarm Systems, etc.) will be adequate to accommodate all mechanically operated Food Service Equipment

hereinafter specified and shown on the Food Service Design Drawings.

- (b) Building H.V.A.C.-related Utilities shall permit all Food Service Equipment items (including Exhaust Hoods and related equipment) to operate in accordance within the Manufacturer's operational guidelines for proper and sustained performance.

IMPORTANT: If these H.V.A.C.-related Utilities are found to be not adequate, the ordering and/or installation of any affected Food Service Equipment items by the F.S.E.C. shall not take place until all related issues are resolved by the H.V.A.C. Contractor (and any other Building Trades that may also be involved).

NOTE: In some cases, the Main Contract Agreement for a particular Project may stipulate that a separate Commercial Food Service/Kitchen Ventilation Contractor and/or Fire Suppression System Contractor shall be hired to perform these services in conjunction with or instead of the H.V.A.C. Contractor.

2. ROOM VENTILATION IN FOOD SERVICE-RELATED AREAS:

- (a) Unless otherwise specified or stated on any drawings for this Project, the H.V.A.C. Contractor shall be responsible for all issues relating to insuring that proper heating and cooling ventilation is consistently maintained within the Food Service-related rooms or areas of this Project.
- (b) Except for Exhaust Hoods, fans and related components (which may be hereinafter specified by the F.S.E.C. and shown on the Food Service Design drawings), the F.S.E.C. shall not be held responsible for any issues relating to, providing and/or maintaining proper heating and cooling ventilation in any room or area where Food Service-related Equipment is to be located.
- (c) The H.V.A.C. Contractor shall insure that adequate room or area ventilation will be furnished in all spaces where this issue is important for the proper operation of specific Food Service-related Equipment items.

This shall include (but not be limited to): refrigeration components, Food Merchandising or display Units that are either mechanically cooled or heated, any Warewashing Equipment that may produce excessive heat and/or condensation during normal operation or any ovens, etc. that may be located in confined spaces.

3.09 SPECIAL NOTES FOR FOOD SERVICE-RELATED EQUIPMENT:

- A. All Food Service-related equipment listed under "Food Service Schedule of Equipment" shall match in every respect all mechanical and electrical requirements indicated on all other Food Service Design Drawings included in the Contract Documents for this Project.

- B. DIMENSIONS: Unless otherwise specified or expressly stated, any and all dimensions either stated in these written Food Service Specifications and/or shown on the Food Service Design Drawings are APPROXIMATE ONLY and MUST BE VERIFIED AND CONFIRMED by the Food Service Equipment Contractor (or any other specified Contractor).

This verification and confirmation of dimensions must be done PRIOR to the ordering and/or installing of any equipment, furniture and/or fixtures included in this Section.

IMPORTANT: In all cases where equipment is intended to occupy fixed locations and spaces, the actual physical Field Conditions of the building are to control the absolute sizes required.

- C. LOCKS FOR FOOD SERVICE EQUIPMENT: The F.S.E.C. shall provide locks for standard manufactured refrigerator and freezer doors, drawers, cabinet doors, etc. included in this Section, unless otherwise specified.

The F.S.E.C. shall verify (in writing) the preferred keying of all locks with the Owner and/or Food Service Operator.

- D. GROMMETS FOR PENETRATIONS IN WORK TABLE OR SERVING COUNTER TOPS: All penetrations in any Food Service Work Table or Serving Counter tops required to run Mechanical Services to any Equipment Items located within or on top of same shall be fitted with rubber or plastic grommets to protect these service lines, unless otherwise specified.

Whenever feasible, the F.S.E.C. shall coordinate the color of each grommet so it corresponds and compliments with the finish of the adjacent flat surface.

3.10 EXISTING FOOD SERVICE-RELATED EQUIPMENT, FURNITURE & FIXTURES:

- A. GENERAL: All applicable conditions of Division 11 Section 114000 of the Project Specifications not mentioned herein shall apply in dealing with all existing Food Service-related Equipment, Furniture and/or Fixtures involved in this Project.
- B. INSPECTION OF EXISTING ITEMS: Prior to submitting the Project Bid, the (prospective) Food Service Equipment Contractor shall physically visit all existing Food Service areas involved and inspect all Food Service-related Equipment, Furniture and/or Fixtures that are herein specified to be re-used.
- C. DEVIATIONS FROM CONTRACT DOCUMENTS: Upon visiting the Jobsite, if the (prospective) F.S.E.C. discovers any deviations between the Food Service Design Drawings or these Written Specifications and actual Field Conditions in regard to re-using existing Food Service-related Equipment, Furniture and/or Fixtures, they shall notify the Food Service (Design) Consultant, Owner and/or the Architect immediately (in writing) of any specific issues.

IMPORTANT: If the Food Service (Design) Consultant, Owner and/or Architect is not notified of any discrepancies with respect to existing items during the Bid Period, it will be assumed that all necessary

refurbishing of these existing items is fully understood and will be done by the F.S.E.C. in accordance with the Bid Documents.

- D. EVALUATION OF EXISTING ITEMS: All existing Food Service Equipment items that are Mechanically Operated, such as Kettles, Ranges, Refrigerators, Slicers, etc., shall be physically evaluated by the F.S.E.C. for current working operation.

IMPORTANT: If, upon inspection, the F.S.E.C. determines that any Food Service Equipment items specified to be-reused are beyond useful or practical repair, he shall notify the Food Service (Design) Consultant, Owner and/or the Architect immediately (in writing). In addition, the F.S.E.C. shall include their recommendation to replace the units in question with similar new units that meet or exceed the operating capabilities of the existing units.

- E. CLEANING & REPAIRS FOR EXISTING UNITS TO BE RE-USED: The F.S.E.C. shall verify all Electric and Plumbing Requirements and shall provide and install all parts required to put the Food Service-related Equipment, Furniture and/or Fixtures in good operating condition.

These items shall be refurbished and/or cleaned, as required, to put them in safe, neat and otherwise good working condition subject to approval by the Food Service (Design) Consultant, Owner and/or the Architect.

After these items are refurbished and/or cleaned, it shall be the responsibility of the F.S.E.C. and/or General Contractor (as specified and/or stated on Food Service Design Drawings) to transport and relocate the equipment to the final position as shown on the Food Service Drawings and made ready for final connection by the various Building Trades.

- F. DISCONNECTION OF EQUIPMENT: All existing Mechanically Operated Food Service-related Equipment and/or Fixtures scheduled to be re-used, relocated and/or discarded shall be disconnected by the respective Building Trades involved, under the direction of the General Contractor.

After these units have has been disconnected, it shall be the responsibility of the F.S.E.C. to remove and transport each existing item to be re-used to a temporary location (either within or outside the Facility) designated by the Owner (unless otherwise specified or stated on Food Service Design Drawings).

- G. RELOCATION & RE-INSTALLATION OF UNITS TO BE RE-USED: Relocation and re-installation of existing Food Service-related Equipment, Furniture and/or Fixtures from present location on Jobsite and/or Storage Area to new designated location shall be the responsibility of the F.S.E.C. and/or the General Contractor (as specified and/or stated on Food Service Design Drawings).

Once this existing equipment is installed, the F.S.E.C. shall provide the proper Start-Up and Demonstrations to the Facility Food Service Staff, as required and hereinbefore specified.

H. REMOVAL, RELOCATION & DISPOSAL OF UNITS NOT RE-USED: Removal, relocation and/or disposal of existing Food Service-related Equipment, Furniture and/or Fixtures not re-used shall be the responsibility of the F.S.E.C. and/or the General Contractor (as specified and/or stated on Food Service Design Drawings).

END OF SECTION

Strategic Equipment, LLC
dba TriMark Strategic
dba TriMark Foodcraft
dba ISI Commercial Refrigeration

Project:
NY Florida UFSD - BUDGET
for Golden Hill ES, Kitchen
Renovation, Nov 2020

From:
Strategic Equipment, LLC
Amy Leasure
5843 Barry Road
Tampa, FL 33634-3020
(813)873-2402 2144
972-896-9893 (Contact)

To:
BBS Architects
Peter Gryniewicz
244 E. Main Street
Patchogue, NY 11772
631-475-0349 128 (Contact)

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Strategic Equipment, LLC
dba TriMark Strategic
dba TriMark Foodcraft
dba ISI Commercial Refrigeration

Submittal Sheet

11/23/2020

ITEM# 1 - HOT FOOD WELL UNIT, DROP-IN, ELECTRIC (1 EA REQ'D)

Low Temp TW-D-4

Low Temp ThermalWell Hot Food Well Drop-In Unit, electric, 58-1/2"W, Dry operation, (4) 12" x 20" sealed hot food wells, fully insulated, individual wired remote solid state controls, stainless steel top & interior liner, galvanized exterior housing, UL, cUL, UL EPH Classified

ACCESSORIES

Mfr	Qty	Model	Spec
Low Temp	1		208v/60/1-ph, 10.8 amps, 2253 watts, direct wire (standard)
Premier Metal & Glass	1	TM2S	TM2S - 1" OD FULL SERVICE FOOD SHIELD WITH SLANTED FRONT, TOP SHELF AND REAR SUPPORTS; 3/8" CLEAR TEMPERED GLASS WITH POLISHED EDGES; BOTH END PANELS INCLUDED; NARROW SURFACE MOUNTING OPTION (644/1); NO HEAT/LIGHT INCLUDED; BRUSHED STAINLESS FINISH; APPROX 60" CL LENGTH; APPROX 162 LBS EA (2 END SUPPORTS)
TRIMARK STRATEGIC	1	INSTALL	TriMark Strategic Installation includes removal of existing equipment and installation of new equipment with utility connections to existing proper utilities per the manufacturer's specifications within 4 ft of connection points. Disposal of existing equipment to school provided dumpster or delivered to school warehouse location.

ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	208	60	1	Direct			10.8	2.253			



Hot Food Drop-In

Dry only Heat Models



Project: _____

Item: _____

Quantity: _____

Date: _____

Drop-in Models	Wells
<input type="checkbox"/> TW-D-1	1
<input type="checkbox"/> TW-D-2	2
<input type="checkbox"/> TW-D-3	3
<input type="checkbox"/> TW-D-4	4
<input type="checkbox"/> TW-D-5	5
<input type="checkbox"/> TW-D-6	6



U.L. Sanitation Classified to NSF Standards

- Dry use, no water required
- Fully insulated, for use in any counter

- 1 to 6 pan units provide for full menus
- Labor saving easy to clean design

Benefits

- ✓ 563 watt heat source (at 208V)
- ✓ Individual solid-state digital controls
- ✓ Fully insulated for use in any counter
- ✓ 1 to 6 pan units provide for full menus
- ✓ Labor saving "easy to clean" design
- ✓ Single electrical connection
- ✓ Fast, easy installation
- ✓ 208V (563 watt) or 120V, 240V (751 watt)

Standard Features

- ✓ Solid state digital controls
- ✓ Full sealing gasket

Optional Features (specify)

- ☐ Small pan divider bars
- ☐ Adapter panel
- ☐ (contact factory)
- ☐ 120V (751 watts)
- ☐ 240V (751 watts)

Hot Food Drop-In
Dry only Heat Models

A.I.A. File No. 00-0-00

SIS No. 00-0-00

REV 10/29/19 - Printed in the U.S.A.



LTI, Inc.
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Jonesboro, GA 30236
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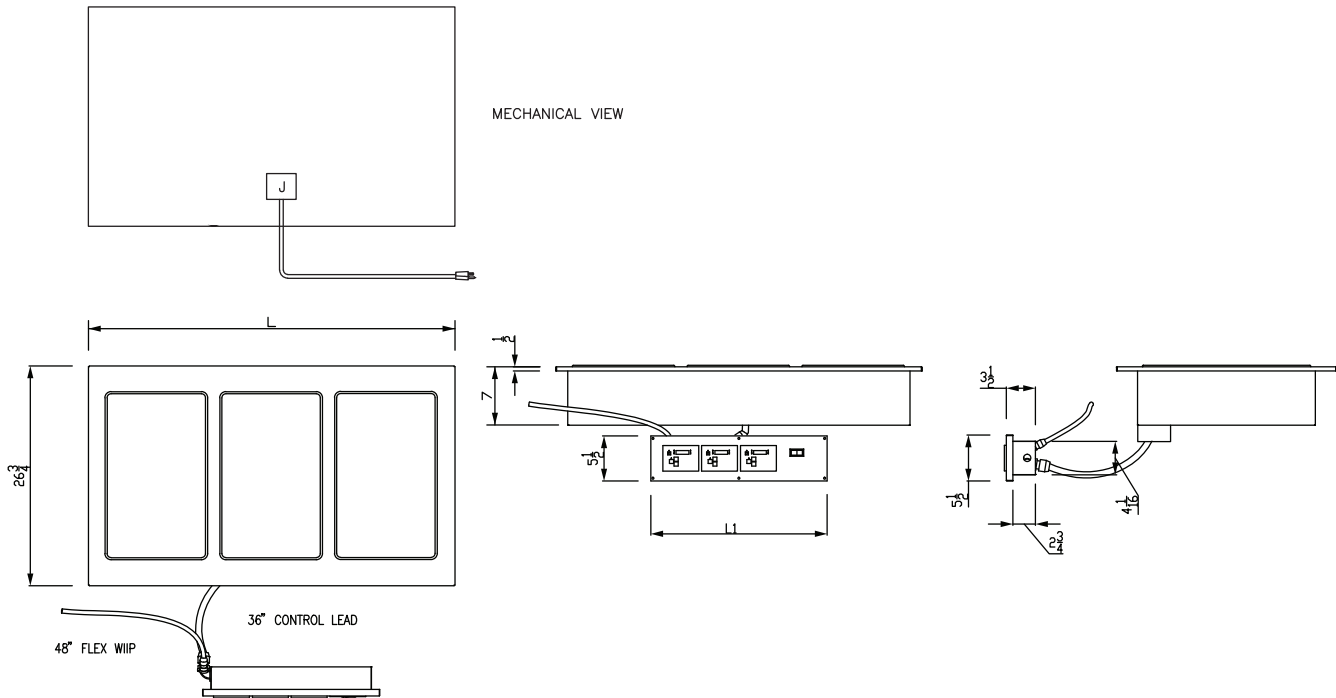
Approvals: _____

Hot Food Drop-In

Dry only Heat Models



Hot Food Drop-In
Dry only Heat Models



Model #	Pans	L	L1	Cut-out size	208V, 1 phase		240V, 1 phase		120V, 1 phase	
					Watts	Amps	Watts	Amps	Watts	Amps
TW-D-1	1	16 1/2"	7 1/4"	22 5/8" x 14 1/4"	563.5	2.7	751	3.15	751	6.25
TW-D-2	2	30 1/2"	12"	22 5/8" x 28 1/4"	1127	5.4	1502	6.3	1502	12.5
TW-D-3	3	44 1/2"	16 3/4"	22 5/8" x 42 1/4"	1690	8.1	2253	9.4	2253	18.8
TW-D-4	4	58 1/2"	21 1/2"	22 5/8" x 56 1/4"	2253	10.8	3004	12.5	3004	25
TW-D-5	5	72 1/2"	26 1/4"	22 5/8" x 70 1/4"	2816	13.5	3755	15.6	3755	31.3
TW-D-6	6	86 1/2"	31"	22 5/8" x 84 1/4"	3380	16.3	4506	18.8	4506	37.6

General Specifications

Top perimeter frame to be constructed of 14 gauge stainless steel, welded, ground and polished with a thermal break provided between the top and heated sections

Interior pan to be 18 gauge stainless steel, fully welded, ground and polished. To be fully insulated with fiberglass insulation.

The exterior jacket to be constructed of 18 gauge galvanized steel.

Each compartment to have 563 watt heat source with solid state digital controls.

All switches and controls to be fully accessible.
Units to be UL listed and shall bear the UL Sanitation seals.

Approval/Submittal (signature required)

Adherence to LTI installation instructions is required. Failure to do so may void the warranty.

Signature _____

Date _____

We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacement for previously purchased equipment.

All equipment to be built in accordance with the Underwriters Laboratories, Inc. and the National Sanitation Foundation, Inc. standards and shall bear the Underwriters Laboratories, Inc. listing label for safety and the Underwriters Laboratories classification label for sanitation.

Control Panel cut-out size

11" X 4 1/4"

15 3/4" X 4 1/4"

20 1/2" X 4 1/4"

25 1/4" X 4 1/4"

30" X 4 1/4"

34 3/4" X 4 1/4"

REV 10/29/19 - Printed in the U.S.A.

LTI, Inc.
1947 Bill Casey Parkway
Jonesboro, GA 30236

(888) 584-2722
lowtempind.com



Changing
how food is served.™

A.I.A. File No. 00-0-00

SIS No. 00-0-00



Strategic Equipment, LLC
 dba TriMark Strategic
 dba TriMark Foodcraft
 dba ISI Commercial Refrigeration

Submittal Sheet

11/23/2020

ITEM# 2 - KETTLE, ELECTRIC, TILTING (1 EA REQ'D)

Therma-Tek TT-TT2/3J-T-E30

Therma-Tilt Tilting Kettle, electric, 30 gallon capacity, 2/3 jacket, thermostatic control 150°-260°F, 304 stainless steel interior liner, domed hinged cover, self-contained, insulated, deep-drawn stainless steel construction, leg mounted, XX.0kW, Made in USA

ACCESSORIES

Mfr	Qty	Model	Spec
Therma-Tek	1		Two year limited parts and labor warranty, standard
Therma-Tek	1		Draw-off valve, 2"
Therma-Tek	1		Specify Electrical Requirement
TRIMARK STRATEGIC	1	INSTALL	TriMark Strategic Installation includes removal of existing equipment and installation of new equipment with utility connections to existing proper utilities per the manufacturer's specifications within 4 ft of connection points. Disposal of existing equipment to school provided dumpster or delivered to school warehouse location.

Insulated Self-Contained Kettle

Electric, 2/3 Jacketed
 Insulated for Safety Deep
 Drawn Construction Tilting,
 Floor Mounted Made in USA

THERMA TILT
 Model TT TK2/3J

Standard Features



(with optional 1 1/2 draw-off valve)

- ◆ Kettle System
 - ◇ Seamless deep-drawn 304 kettle liner with a integrally formed radius lip
- ◆ 304L stainless kettle jacket
- ◆ Kettle protection system
 - ◇ Thermostat temperature control, 150°F - 260°F
 - ◇ Pressure relief valve
 - ◇ Air eliminator valve
 - ◇ Pressure gauge
 - ◇ Jacket-water fill
 - ◇ Automatic low water cut off and indicator light
 - ◇ Field replaceable heating elements
 - ◇ Tilting cut-off switch
- ◆ Full body insulation between kettle jacket and outer casing
- ◆ 304 stainless outer casing seam welded to radius lip
- ◆ 304 stainless, seam welded control console
- ◆ 304 stainless, reinforced gear box
- ◆ Self-locking worm gear tilt mechanism
- ◆ 304 stainless, 2" tubular support frame
- ◆ Adjustable flanged feet

Models and Capacities

TT-TT2/3J-T-E20QT-FM 20 gal. (76 l.)

TT-TT2/3J-T-E30QT-FM 30 gal. (114 l.)

TT-TT2/3J-T-E40QT-FM 40 gal. (151 l.)

Select draw-off valve: ☐ 2" ☐ 3"
 With: ☐ compression ☐ ball type fitting
 See price list for other draw-off options.

Select Voltage: ☐ 208V ☐ 240V ☐ 380V
☐ 415V ☐ 440V ☐ 480V

Revision 113

Optional Features and Accessories

See price list for supplemental information regarding options

Faucet Options:

- ☐ Single or dual faucet with bracket & 12" or 18" swing nozzle
- ☐ 48" flexible spray hose assembly (vinyl or stainless) for dual or single faucet
- ☐ Faucet bracket
- ☐ Automatic water filling meter

(Call for information regarding additional faucet options)

Prison/Security Options:

- ☐ Fasteners (screws & nuts)
- ☐ Tamper resistant driver tools
- ☐ Lockable control cover

Other Options:

- ☐ Electric timer with buzzer
- ☐ Pressure switch
- ☐ Mixer/agitator, 2 speed

Accessories:

- ☐ Pour lip pan holder assembly
- ☐ Measuring strip
- ☐ Care kit

Covers:

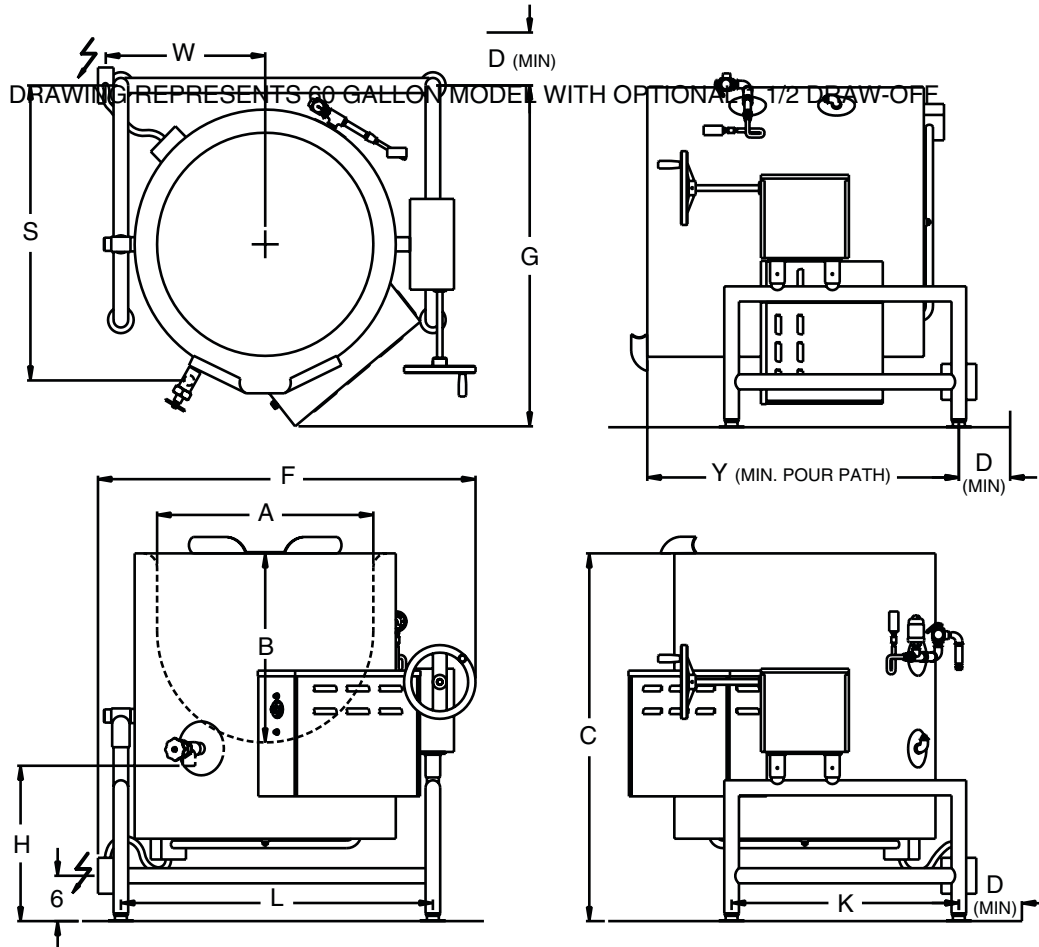
- ☐ Lift-off or 2 piece hinged
- ☐ 1 piece actuator-assisted, 20 - 60 gal.

Baskets:

- ☐ Single basket, 20 - 40 gal.
- ☐ Tri-basket insert
- ☐ Nylon bag insert with spreader ring

THERMA TILT
Model TT TK2/3J

Electric, 2/3 Jacketed Insulated
 for Safety™ Deep Drawn
 Construction Tilting, Floor
 Mounted Made in USA

**Insulated Self-
 Contained Kettle**

MODEL DIMENSIONS

GAL	A	B	C	D	F	G	H*	K	L	S*	W	Y
20	22.0	16.0	41.6	7.0	43.1	42.0	22.2	31.0	35.0	36	18.0	35.5
30	23.0	20.3	43.5	7.0	44.1	42.5	19.8	31.0	36.0	36	18.5	37.4
40	25.5	22.3	47.5	7.0	46.6	43.5	21.7	31.0	38.5	37.3	19.9	41.4

*Dimensions H & S apply only if an optional 2" draw-off is ordered. If a 3" draw-off is required, contact Legion for applicable dimensions.

MODEL ELECTRICAL SPECIFICATIONS (AMPERES PER LEG)

GAL	KW	208 Volt		240 Volt		380 Volt		415 Volt		440 Volt		480 Volt	
		1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø
20	12	57.7	33.3	50.0	28.9	31.6	18.2	28.9	16.7	27.3	15.7	25.0	14.4
30	24	115.4	66.6	100.0	57.7	63.2	36.5	57.8	33.4	54.5	31.5	50.0	28.9
40	24	115.4	66.6	100.0	57.7	63.2	36.5	57.8	33.4	54.5	31.5	50.0	28.9

Revision 819



Strategic Equipment, LLC
 dba TriMark Strategic
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 dba ISI Commercial Refrigeration

Submittal Sheet

11/23/2020

ITEM# 3 - CONVECTION OVEN, ELECTRIC (2 EA REQ'D)

Therma-Tek TT-PA-D-E

Proair Convection Oven, Electric, double-deck, standard depth, (5) chrome-plated racks with (12) positions per unit

ACCESSORIES

Mfr	Qty	Model	Spec
Therma-Tek	2		Two year limited parts and labor warranty, standard
Therma-Tek	2		Specify Electrical Requirement
Therma-Tek	2	SK	Double-Deck Kit, with short legs, required for double unit
TRIMARK STRATEGIC	2	INSTALL	TriMark Strategic Installation includes removal of existing equipment and installation of new equipment with utility connections to existing proper utilities per the manufacturer's specifications within 4 ft of connection points. Disposal of existing equipment to school provided dumpster or delivered to school warehouse location.

ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	120	60	1				7		1/2		
2	120	60	1				7		1/2		

GAS

	SIZE	MBTU	KW
1	3/4"	110.0	
2	3/4"		

STEAM

	INLET SIZE	RETURN SIZE	LB/HR	PSIG (min)	PSIG (max)
1					
2					

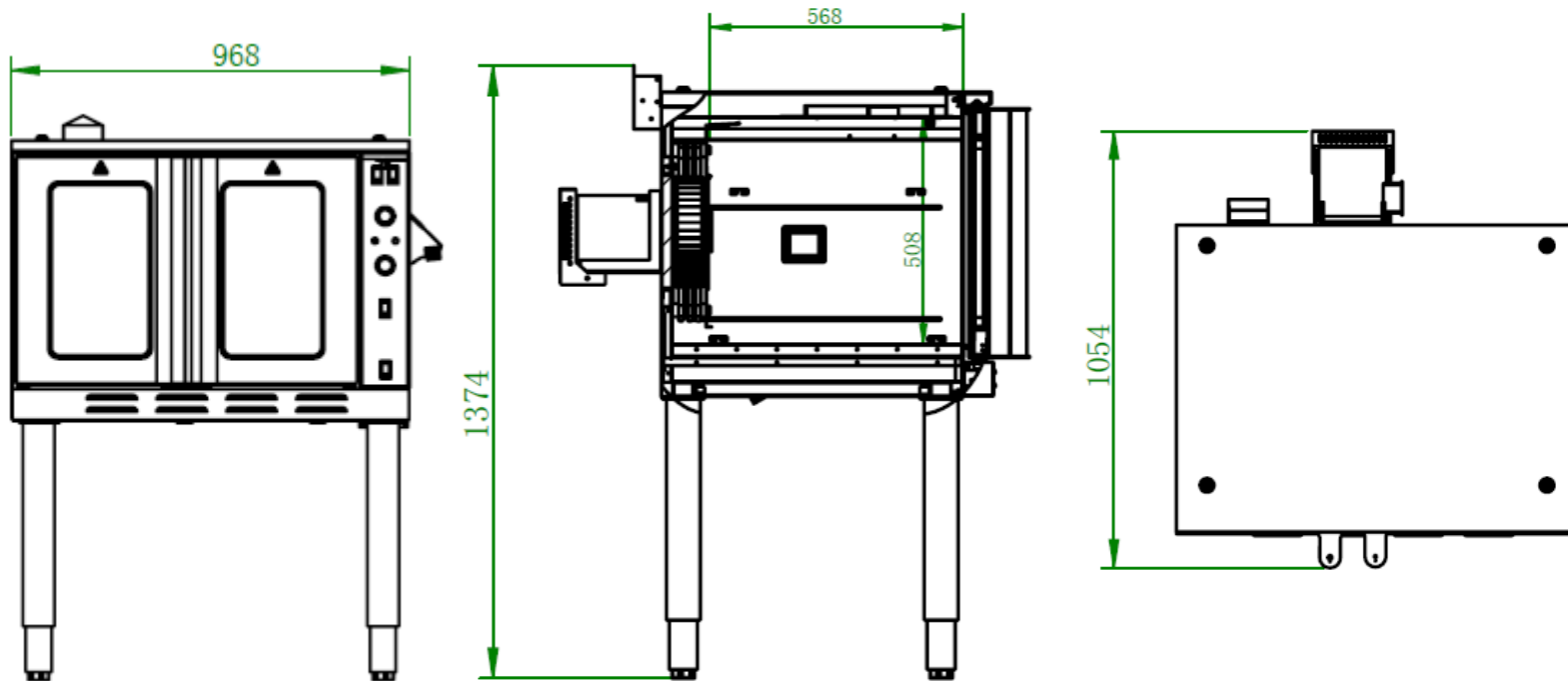


Electric Convection Oven



- ★ Electronic thermostat with temperature control range of 150 °F (65°C) to 550°F(280 °C)
- ★ Two speed and 1/2 horsepower blower motor with automatic thermal overload protection
- ★60-minute, continuous-ring timer
- ★Control area cooling fan
- ★Interior oven lamp
- ★Porcelain interior chamber
- ★Three nickel plated racks, eleven rack positions with a minimum of 1-5/8” (41mm) spacing
- ★Full angle-iron frame
- ★Stainless steel front, top, and sides
- ★Dual pane thermal glass windows encased in stainless steel door frames
- ★Bakelite door handle with independent door operation
- ★Removable front control panel
- ★Black-powder-coated legs with adjustable stainless steel feet

FEC100 ELECTRIC CONVECTION OVEN	
Dimensions (L×W×H) mm	968 × 1054 × 1374
Voltage	208-240V, 60Hz 1 Ph or 3 Ph
Power	9-11.9KW
Chamber (L×W×H) mm	735 × 508 × 568
Net Weight	105kg



Front View

Side View

Top View



1. Power Switch

Switch ON to use the oven

Switch OFF when done using the oven

2. Fan Mode

COOK mode, fan runs continuously during cooking

COOL mode, rapidly cool down the oven after cooking

3. Cook Timer

Turn knob to set a cook time.

An alarm will sound when the timer runs out.

Turn the knob to OFF to cancel the alarm.

4. HEAT-ON Indicator

The HEAT-ON indicator will light when the heating element is on and will remain on while the oven preheats.



5. Cook Temperature Control

Turn the knob to desired temperature. When the set point is reached, the HEAT ON indicator will be off. When the heating element maintains the set temperature, the indicator will cycle between ON and OFF.

6. HI/LOW Fan Speed

Use to select fan speed (HI/LOW). The appropriate speed is determined by the type of food being cooked.

7. Oven Interior Light Switch

Press to turn on the light. The light is controlled independently.

Dual-Speed Fan**Porcelain Interior****Adjustable Racks**



Strategic Equipment, LLC
 dba TriMark Strategic
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Submittal Sheet

11/23/2020

ITEM# 4 - RANGE, 24", 4 ROUND SOLID BURNERS (1 EA REQ'D)

Imperial IR-4-E-XB

Pro Series Restaurant Range, electric, 24", (4) round elements, solid top, open cabinet, bottom shelf, infinite heat controls, stainless steel front, sides, backguard, landing ledge & kick plate, 6" legs, adjustable feet, cETLus, ETL, CE

ACCESSORIES

Mfr	Qty	Model	Spec
Imperial	1		Limited one year parts and labor warranty, standard
Imperial	1		480v/60/3-ph, 13.0 amps, 8.0 kW
Imperial	1		Stainless steel backguard with shelf standard
TRIMARK STRATEGIC	1	INSTALL	TriMark Strategic Installation includes removal of existing equipment and installation of new equipment with utility connections to existing proper utilities per the manufacturer's specifications within 4 ft of connection points.

Disposal of existing equipment to school provided dumpster or delivered to school warehouse location.

ELECTRICAL

	VOLTS	CYCLE	PHASE	CONN	AFF	NEMA	AMPS	KW	HP	MCA	MOCP
1	480	60	3				13.0	8.0			

24" ELECTRIC RANGES

IMPERIAL®

Model Numbers

IR-4-E

IR-4-E-XB



9" (229 mm) sealed round plate elements with easy to clean flat surface.



5 KW element provides even heating throughout the oven cavity.



Splatter screen protects the element from spills.



Large 5" (127 mm) stainless steel landing ledge for convenient plating.



Durable cast aluminum with a Valox™ heat protection grip.



IR-4-E shown with optional casters

ROUND PLATE ELEMENTS - 2 KW round plate elements with easy-to-clean flat surface.

- Provides a solid flat surface for fast, even heating.
- Plates are 9" (229) diameter for maximum pan contact.
- Solid top prevents spills from entering unit making clean-up easy.
- Infinite heat controls for maximum cooking flexibility.

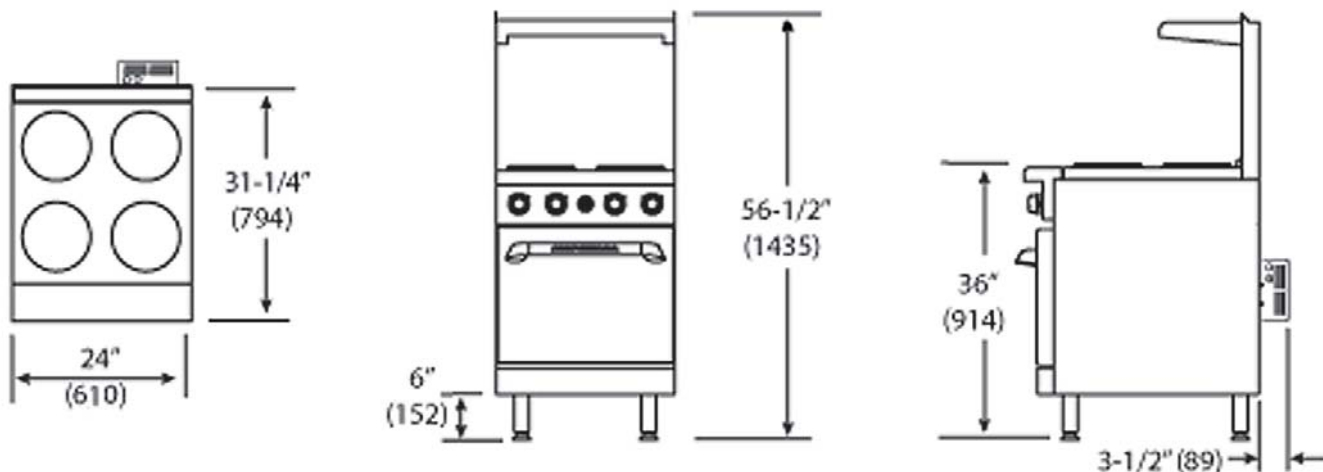
SPACE SAVER OVEN - High performance 5.3 KW element provides even heating throughout the oven interior.

- Unique baffle above the element distributes heat flow to provide even cooking temperatures throughout the 5 KW oven.
- Splatter screen protects the element from spills.
- Space saver oven interior accommodates standard 18" x 26" (457 x 660 mm) sheet pans front-to-back.
- Oven is 20" w x 26" d x 14" h (508 w x 660 d x 356 h mm).
- Heavy duty thermostat with temperature range from 150°F to 500°F (65°C to 260°C).
- Porcelainized sides, rear, deck and door lining.
- Stamped inner door liner provides extra strength while optimizing heat retention.
- One chrome oven rack is included.





24" ELECTRIC RANGES

IMPERIAL®



24" ELECTRIC RANGES

TOP	MODEL	NUMBER OF PLATES	OVEN WIDTH	SHIP WEIGHT (KW) LBS
	IR-4-E	4	20" (508 mm)	(210) 465
	IR-4-E-XB	4	N/A	(184) 405

Measurements in () are metric equivalents

NOTES

- "XB" specifies Open Cabinet Base

EXTERIOR

- Stainless steel front, sides, backguard, shelf, landing ledge and kick plate
- Welded and polished stainless steel seams
- Large 5" (127 mm) stainless steel landing ledge
- Control knobs are durable cast aluminum with a heat protection grip
- 6" (152 mm) heavy duty legs with adjustable feet
- One year parts and labor warranty

DIMENSIONS

24" w x 31-1/4" d x 36" h*
(610 x 794 x 914 mm)

* to cooktop

CRATED DIMENSIONS

26-1/2" w x 39" d x 35" h
(673 x 991 x 889 mm)

CLEARANCE REQUIREMENTS

For use only on non-combustible floors. Legs or casters are required for non-combustible floors; or 2" (51 mm) overhang is required when curb mounted. Provide 0" clearance from non-combustible surfaces and 6" (152 mm) from combustible surfaces.

24" WIDE RANGES ELECTRICAL REQUIREMENTS

Model	Total KW	Volts	Ph	Amps
IR-4-E	13.3	208	1	64
	13.3	208	3	38
	13.3	240	1	56
	13.3	240	3	33
	13.3	480	3	17
IR-4-E-XB	8	208	1	39
	8	208	3	23
	8	240	1	24
	8	240	3	25
	8	480	3	13

- Available in 208 and 240 volts, 1 and 3 phase.
Please indicate at time of order

OPTIONS AND ACCESSORIES

- 6" (152 mm) stainless steel stub back, in lieu of standard backguard
- 11" (279 mm) stainless steel stub back, in lieu of standard backguard
- Reinforcement channels for mounting cheesemelter or salamander
- Extra oven racks
- 6" (152 mm) casters
- 480 volts, 3 phase



IMPERIAL®

E-1 2/15

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Imperial reserves the right to change specifications at any time without prior notice and without any obligation for past or future equipment purchases. Visit www.imperialrange.com for specification updates.

DIVISION 12 - FURNISHINGS

SECTION 12462 - LAMINATE CLAD CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:

1. Drawings and provisions of the contract including General Conditions Supplementary Conditions and Division 1, apply to this section.

B. Section Includes:

1. Furnish and install plastic laminate casework and accessories as shown and listed on drawings and specified herein. Includes all countertops, sink cutouts, splashes, supports, shelving, and filler panels necessary for a complete casework installation.

C. Related Requirements to be Performed by Others:

1. Section 06100 - Rough Carpentry
2. Section 06200 - Finish Carpentry
3. Section 07900 - Caulking
4. Section 09650 - Resilient Flooring

1.02 REFERENCES

- A. ANSI-A135: For all hardboard.
- B. ANSI-A161.2-1998: For performance of fabricated high-pressure decorative laminate countertops.
- C. ANSI-A208.1-2016: For grade M-3 mat-formed wood particleboard.
- D. BHMA A156.9: For grade-1 hinge requirements.
- E. NEMA 3 LD-2005: For performance requirements of high pressure laminates.
- F. AWS: American Woodworking Standards, Edition 2.

1.03 DEFINITIONS

A. Exposed:

1. In casework, surfaces visible when drawers and opaque doors (if any) are closed; behind clear glass doors; bottoms of cabinets 42" or more above finished floor; and tops of cabinets less than 78" above finished floor.

B. Semi-Exposed:

1. In casework, surfaces that become visible when opaque doors are open or drawers are extended; bottoms of cabinets more than 30" or tops of cabinets less than 42" above finished floor.

1.04 SUBMITTALS

A. Shop Drawings:

1. Comply with Division 1.
2. Include catalog numbers and detailed written specifications.
3. Submit three sets of shop drawings consisting of:
 - a. Finish, hardware, construction options selection sheet.
 - b. Small scale floor plan showing casework in relation to the building.
 - c. Large scale elevations and plan views.
 - d. Cross-sections; service runs; locations of blocking within walls (blocking is done by others); rough-in requirements and, sink centerlines.
4. Manufacturer and/or Contractor verifies all critical building dimensions prior to fabrication.

B. Samples:

1. Submit one set of laminate color brochures or webpage reference from standard laminate manufacturers Wilsonart, Formica, Pionite, and Nevamar.
2. Submit one edge color sample chain.
3. Submit catalog showing construction details, material specifications and hardware specifications of all items used.

C. LEED Submittals (if required):

1. Provide EPP certificates of core for Credit MR 4.1 for casework core having recycled content.
2. Provide FSC certificate for Credit MR 7: for products having chain-of-custody certificate certifying that the wood used in the casework complies with FSC requirements.
3. Provide product data for IEQ 4.4: for casework core being manufactured without the use of urea formaldehyde.

D. Warranty:

1. Provide sample warranty document stating specified terms as referenced in 1.8.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Must be certified for chain of custody by a third party certification group approved by FSC.
- B. Unless otherwise indicated, comply with AWI, for grades of interior architectural woodwork, including installation, complies

with requirements of grades specified. The manufacturer, upon award of work, shall register the work under this section with AWI Quality Certification Program (800-449-8811).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver casework once painting, and similar requirements have been completed that will not damage casework. This includes ensuring spaces are enclosed and weather tight.
2. All casework shall be blanket wrapped for protection during shipping.

B. Storage and Handling:

1. Casework must be protected from dust, dirt and/or other trades.
2. Countertops are stacked, properly supported and spaced evenly to avoid warping. Large pieces are stacked first on the pallets with shorter pieces stacked on top.

1.07 WARRANTY

A. Provide a **Five-Year** warranty to the owner against defective material and workmanship.

1. The warranty specifically does not cover any product or hardware, which has been incorrectly installed, including poor climate conditions, exposed to excessive loads or abuse.
2. Non-casework items supplied, but not necessarily manufactured by the casework manufacturer including, but not limited to sinks, fixtures, apparatus, fume hoods, keyboard trays, spray booths, lights, power outlets, and power strips shall be covered under the original manufacturers' warranty.

PART 2- PRODUCTS

2.01 MANUFACTURERS

- A. Design is based on use of products as manufactured **Case Systems**, 2700 James Savage Road, Midland, Michigan 48642 (989) 496-9510 and/or approved dealers, and the terminology used may include reference to that manufacturer's proprietary products. Such reference shall be construed only as establishing the quality of materials and workmanship to be used under this section and shall not, in any way, be construed as limiting completion.

2.02 MATERIALS

A. Provide Plastic Laminate Faced Cabinets Manufactured with:

1. Particleboard Core:

- a. All particleboard shall be Grade M-3i and shall meet or exceed all requirements as set by ANSI-A208.1-2016.

Modulus of Rupture	2176 psi
Modulus of Elasticity	362600 psi
Internal Bond	73 psi
Linear Expansion	0.40%
Thickness Tolerance	+/- 0.008"
Face Screw Holding	225 pounds Min

- 2. MR (Moisture Resistant)/FSC Core shall be:

- a. Interior-Grade moisture resistant particleboard.
- b. Meet or exceed M-3i Grade, according ANSI-A208.1-2016.

- 3. Low Emitting Core shall be: (For LEED Projects)

- a. ULEF/FSC (No added Urea Formaldehyde) M-2 Particleboard:

- 1. For casework core having recycled content.
- 2. For casework core being manufactured without the use of urea formaldehyde.
- 3. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

- b. ULEF/FSC (No added Urea Formaldehyde) Plywood:

- 1. Plywood that meets or exceeds the standards set forth by the APA for structural use panels.
- 2. For casework core being manufactured without the use of urea formaldehyde.
- 3. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

- c. FSC M-3i Particleboard:

- 1. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

- d. FSC Plywood:

- 1. For products having chain-of-custody certificates certifying that the wood used in the casework complies with FSC requirements.

B. Joinery:

- 1. Mechanical Joinery:

- a. All cabinet body components shall be secured utilizing concealed interlocking mechanical fasteners as approved by the AWI Quality Standards 8th Edition-2003 Sections 400A-T-12, 400B-T10 and 1600-T-11.

C. Surface Material:

1. Acceptable laminate color, pattern, and finish as either scheduled or otherwise indicated on drawings or as selected by Architect from manufacturer's standards types and nominal thickness including:
 - a. Vertical surface decorative grade VGS: .028" thick
 - b. General purpose decorative grade HGS: .48" thick
 - c. Cabinet decorative liner grade CLS: .020" thick
 - d. Non-decorative backer grade BKH: .028" thick
 - e. Thermally fused melamine laminate.
 - f. Chemical resistant decorative laminate.

D. Edge banding:

1. PVC
 - a. Shall be applied utilizing hot melt adhesive and radiused by automatic trimmers. Edging shall be available in a variety of color options.

E. Adhesives:

1. PVA
 - a. Adhesive shall be mechanically applied.
 - b. NAUF, no VOC
2. EVA
 - a. Adhesive shall be mechanically applied.

F. Protective coating option:

1. All surfaces, including: pulls, hinges, countertops and edge banding be coated with OEM-treated, quat-silane antimicrobial
AEM 5772 from AEGIS Environments.

2.03 FABRICATION

A. General Cabinet Body Construction:

1. Cabinet Box Style shall be **Reveal Overlay**.
2. Cabinet Box Core shall be **Particleboard**.
3. Bottoms and ends of cabinets, and tops of tall cabinets and tops and bottoms of wall cabinets (all structural components) shall be 1"-inch thick.
4. All panels shall be manufactured with balanced construction.
5. Fixed interior components such as dividers, and cubicle compartments shall be full 3/4" thick and attached with concealed interlocking mechanical fasteners.

6. Cabinet body exterior surfaces shall be: **VGS.**
7. Cabinet finished interior options shall be: **Finished at opens. (Decorative thermally fused).**
8. Cabinet body interior surfaces shall be: **Thermally Fused.**
9. In closed cabinets body front edge shall be: **.020" PVC**
10. Mounting stretchers are 3/4" thick structural components fastened to end panels and back by mechanical fasteners, and are concealed by the cabinet back.
11. When the rear of a cabinet is exposed, a separate finished 3/4" thick decorative laminate back panel shall be provided.
12. Backs of cabinets are 1/2" thick surfaced both sides for balanced construction and fully captured on both sides and bottom.
13. A 5mm diameter row hole pattern 32mm (1-1/4") on center shall be bored in cabinet ends for adjustable shelves. This row hole pattern shall also serve for hardware mounting and replacement and/or relocation of cabinet components.
14. An upper 3/4" thick stretcher shall be located behind the back panel and attached between the end panels with mechanical fasteners. This stretcher is also fastened to the full sub-top thus capturing the back panel.

B. Base Cabinet Construction:

1. All base cabinets, except sink cabinets, shall have a solid 3/4" thick sub-top of core (as specified above), fastened between the ends with interlocking mechanical fasteners.
2. Sink cabinets with a split removable back panel shall have a formed metal front brace, and steel corner gussets shall be utilized to support and securely fasten top in all four corners. Front brace shall be powder coated black.

C. Tall Cabinet Construction:

1. All tall cabinets shall be provided with an intermediate fixed shelf to maintain internal dimensional stability under heavy loading conditions as well as an intermediate 3/4" thick stretcher located behind the back panel and be secured between the cabinet ends with mechanical fasteners. The stretcher shall be secured to the shelf through the back with #8 x 2" plated flat head screws.

D. Wall Cabinet Construction:

1. All wall cabinet bottoms shall be 3/4"-inch thick core (type specified above), mechanically fastened between end panels and secured to the bottom back stretcher. A lower 3/4" thick stretcher shall be located behind the back panel and attached

between the end panels with mechanical fasteners. The stretcher is also secured through the back and into the cabinet bottom. Wall cabinets over 36" in width shall receive a fixed intermediate partition.

2. All wall cabinet exterior bottoms shall be: **Match Exterior Surface.**
 3. All wall cabinet tops shall be: **¾-inch.**
- E. Tall and Wall Cabinet Top Edges shall be: **.020" PVC at Top of End Panels, Stretchers & Back.**
- F. Tall, Wall and Hutch Tops shall be: **HPL to Match Exterior Surface.**
- G. Tall, Wall and Hutch Upper Door Reveal shall be: **15mm Reveal.**
- H. Toe Base of Cabinet:
1. Individual bases shall be constructed of: **Pressure treated plywood** factory applied to base and tall cabinets and shall support and carry the load of the end panels, and the cabinet bottom, directly to the floor. The base shall be let in from the sides and back of the cabinet to allow cabinets to be installed tightly together and tight against a wall, also to conceal the top edge of applied vinyl base molding (not supplied by casework manufacturer). There shall be a front to back center support for all bases over 30" wide.
 2. Toe Base Height: **96mm.**
 3. Toe Base Options: **Attached.**
- I. Drawer Fronts and Solid Doors:
1. All drawer fronts and solid door components shall be: **Particleboard** surfaced both sides for balanced construction.
 2. Options shall be: **HPL Door and Drawer Front Exterior and Grade CLS on Interior or Corkboard Doors as selected by Architect.**
 3. Surfaces shall be: **HPL Grade VGS.**
 4. Door and drawer front edge shall be: **3mm PVC.**
- J. Drawer Boxes:
1. Drawer box constructed with a full 1/2" thick core shall be: **Particleboard** non-racking, non-deflecting platform bottom that is carried directly by "L" shaped, bottom mount drawer glides.
 2. Drawer box at finished interiors shall be: **Surface to Match Standard Interior.**

3. Standard: Slides are secured with 1-1/4" long screws driven through the platform and into the sides. Drawer box sides, backs, sub-front, and bottom shall be 1/2". The top edge shall be nominal 1mm (.020") PVC matching the drawer color. Drawer box corners shall be joined with fluted hardwood dowels and glue spaced at a minimum of 32mm on center. Drawer box fronts shall be removable and attached to drawer box sub-front with screws from inside of drawer. Horizontal parting rails between drawers shall be 3/4" thick core, with balanced surfaces, secured to and further reinforcing cabinet ends. File drawer box shall have full-height sides supporting a heavy-duty support rail for hanging file folders.

K. Doors:

1. Solid Doors shall be: **3/4" thick core.**
2. Glazed Doors, Framed shall be:
 - a. Hinged or sliding 3/4" thick, framed doors shall be: **Tempered Glass Panels.** Panels must be 1/4" thick. Glazing panel shall be set into the doorframe with the use of a separate molding. Glazing shall be held in place with removable stops.
3. Glazed Doors, Frameless shall be:
 - a. Sliding, minimum 1/4" thick tempered glass panels. All edges to be radius ground and polished.
4. Sliding Doors shall be:
 - a. Extruded aluminum upper track with anodized finish. All tall cabinets shall receive two hanging brackets per door with two rollers per bracket. All other cabinets shall receive two hanging brackets per door with one roller per bracket. The bottom of door shall be captured in a retainer to prevent doors from swinging in or out.
5. Pocket Doors shall be:
 - a. Zinc plated, self-closing, three-way adjustable geometric door hinge with precision steel ball bearing slides.

L. Shelves:

1. Adjustable:
 - a. Adjustable shelves shall be: **Particleboard** with balanced surfaces.
 - b. Adjustable shelves in closed cabinets shall be: **1" for All Shelves.**

- c. All adjustable shelves in open cabinets shall be: 1" thick, except for special use cabinets such as mail, cubical, instrument or locker type units.
- d. Adjustable shelf edge on open cabinets shall be: **3mm PVC on Front Edge.**
- e. Adjustable shelf edge on closed cabinets shall be: **.020" PVC on All Four Edges.**
- f. Adjustable shelf shall be set back: **15mm from the front or 23mm setback option when locks are used.**
- 2. Fixed:
 - a. Fixed shelves shall be: **Particleboard.**
 - b. Fixed shelves shall be: **1" for All Shelves.**
 - c. Fixed shelf surfaces on closed cabinets shall be: **Match Interior Selections.**
 - d. Fixed shelf surfaces on open cabinets shall be: **HPL to Match Exterior.**
- 3. Wall shelving selections for model numbers R204, R205, R206 only shall be:
 - a. **3mm PVC.**
 - b. **Particleboard**
 - c. **Thermally Fused**
- 4. Wire Shelves shall be white, plastic coated.
- 5. Hardboard Shelves shall be ¼" thick tempered hardboard. All hardboard shall have a "S2S" surface finish.

M. Specialty Products:

- 1. Countertops:
 - a. High-pressure decorative laminate, nominal **1-1/2" thick buildup**, conforming to NEMA Standard LD3-2005 and ANSI A161.2-1998.
 - 1. General Purpose: **HGS.**
 - 2. Laminate bonded to M-2: **Particleboard** core with PVA rigid adhesives. Core shall be balanced with backing Grade BKL.
 - 3. All joints shall be secured with biscuits for alignment and tight joint fasteners.

4. Provide 4" high back splashes with thickness matching countertop thickness where shown and at all ends abutting walls and adjacent cabinets.
5. Provide edges: **3mm**
6. The maximum lengths of HPL buildup particleboard tops is 12' and the maximum lengths of HPL buildup plywood tops is 8'.

2.04 FINISHES

A. Plastic Laminate Casework Colors:

1. High Pressure Laminate is available in non-premium, non-specialty and manufacturers' standard suede finishes from our select laminate manufacturers, including:
 - a. **Wilsonart® in a "60" or "38" matte finish and Standard: Formica in a "58" finish, unless otherwise noted on the Construction Documents.**
 - b. Color: Specialty and other manufacturer finishes are available with additional cost and longer lead times.
2. Thermally Fused Melamine Laminate that meets performance requirements of ANSI/NEMA 3 LD - 2005 for GP-28.
 - a. **Natural Almond (Wilsonart D30), Fashion Grey (Wilsonart D381), Frosty White (Wilsonart 1573).**
3. Cabinet Liner .020" thick, high-pressure cabinet liner conforming to ANSI/NEMA 3 LD - 2005, Grade CLS. Surface texture shall be similar to exterior finish. Color shall match interior.
 - a. **Almond, Grey, White.**

B. Accessories:

1. Hinges:
 - a. 5-Knuckle Hinge / Reveal Overlay: Three finishes are available as standard in epoxy powder coat: **Black, or Almond, or Platinum.**
2. Pulls:
 - a. **96mm Stainless Steel**
 - b. Epoxy Coated Wire Pulls shall be available as standard in: **Almond, Platinum, or Black.** Or as specified by Architect.

C. Glazed Door Trim shall be one of our standard colors: **Black, White, Almond, or Grey.**

D. Countertop Supports shall be in one of our standard colors: **HPL to match.**

- E. Round Grommet shall be in one of our standard colors: **Black.**
- F. Round Grommets shall be in one of our standard colors: **Black.**

2.05 ACCESSORIES

A. Hardware:

1. Hinges

- a. 5-Knuckle Hinges/Reveal Overlay: Standard: Hinges shall be: .095" thick settle five-knuckle hospital-tip, institutional Grade (Grade 1 per ASNI/BHMA A156.9) quality with .187" diameter tight pin. Each hinge shall be secured with a minimum of nine No. 8 screws. Hinge shall permit door to swing 270 degrees with binding. Doors less than 48" in height shall have two hinges. Doors have over 48" in height shall have three hinges.

2. Pulls:

- a. One pull shall be: located at the centerline of the drawer, regardless of width, to ensure ease of operation and maximize drawer slide life.

- 1. **Epoxy coated wire pull, 8mm diameter with 96mm O.C. mounting holes.**

3. Drawer Slides:

- a. Full extension, bottom mount epoxy coated with captive roller and positive in stop. Slide shall have 100lb. load rating, must be: full extension, and prevent drawer fronts from contacting the cabinet body. Drawer slides must meet or exceed Grade 1 requirements per ANSI/BHMA.

4. Wall Shelving Hardware:

- a. **Heavy-duty wall shelving hardware, including standards and brackets, are available in an anochrome finish.**
- b. Bracket Mounted Shelf Core shall be: **Particleboard.**
- c. Bracket Mounted Shelf Edge shall be **3mm.**
- d. Bracket Mounted Shelf Surface shall be: **VGS Laminate.**

5. Shelf Clips:

- a. Shelf clips shall be injected molded clear plastic, with a double pin engagement 32mm on center and shall have 3/4" and 1" anti-tip locking tabs as approved in AWI 400B-T-9 for premium Grade. Shelf clips shall be:

single pin plastic shelf clip with anti-tip locking tabs, used for all 1/4" hardboard shelves.

6. Coat Hooks shall be Zinc plated, single prong and double prong.
7. Closet Rods shall be Zinc plated rod, 1" diameter with captive sockets.
8. Locks:
 - a. Lock Locations:
 1. **Locks at All**
 - b. Lock Type:
 1. **Standard Lock - National: Five disc tumbler cam locks, chrome plated steel faceplate. All locks keyed alike or keyed differently by room and mater keypad. Shall permit a minimum of 50 keying options. Lock core is removable permitting owner to easily change lock arrangements. Inactive door of base and wall cabinets shall be: secured by using an elbow catch, or a chain pull for tall cabinets].**
9. Casters:
 - a. Shall be available in both 4" (3" diameter wheel) and 6" (5" diameter wheel) nominal heights. 4" casters must have a minimum load rating of 165 lbs per caster and the 6" casters must have a minimum load rating of 200 lbs per caster. Shall be ball bearing with 360° swivel. Shall have non-marring wheels available in both locking and non-locking.
10. Catches:
 - a. Chain Pulls shall be zinc plated, spring loaded door catch used to hold door securely shut.
 - b. Chain Stops shall be zinc plated, looped chain used to limit door swing as specified, mounting plate at each end of chain shall use (4) #7 x 5/8" screws to secure to cabinet door and end panel. They shall be on cabinets at adjoining walls and where casework and countertops can interfere with the door swing of the tall cabinet.
 - c. Elbow Catch shall be chrome plated, spring loaded, used to hold non-locking door securely shut.
 - d. Roller Catch, (not used with self-closing hinges) shall have: heavy-duty, spring-loaded roller, with molded plastic bumper mounted at door top to keep door securely shut.

- e. Magnetic Catch, (not used with self-closing hinges) shall have: white plastic housing with two 32mm spaced, elongated holes for screw-attachment to allow adjustability.
 - f. Catches shall be: **1 Roller at All.**
11. Tote Tray shall be white, high impact resistant polystyrene, with label holder permanently attached to face of tray. Supported by individual polycarbonate channels mounted to cabinet ends and partitions with two integral 5mm diameter pins and secured with one-euro style screw. Height adjustable on 32mm (1-1/4") centers.
12. Countertop Supports:
- a. Powder coated, formed metal supports. Must provide attachment points between countertop and wall.

PART 3 - EXECUTION

3.01 INSTALLERS

- A. Installation shall be: by casework manufacturer's authorized representative.

3.02 INSTALLATION

- A. Casework shall not be: installed until concrete, masonry, and drywall/plaster work is dry.
 - 1. If ambient conditions are not met at the time of requested delivery, the general contractor or owner must provide Case Systems a letter that releases manufacturer from any liability and responsibility from any warranty or damage resulting from not complying with required ambient conditions.
- B. Casework shall be: installed plumb and true and is to be securely anchored in place.
- C. The casework contractor shall verify all critical building dimensions prior to fabrication of casework.
- D. Provide all labor for unloading, distribution, and installation of casework and related items as specified.
- E. All casework shall be: securely anchored to horizontal wall blocking, not to plaster lathe or wall board.
- F. The casework manufacturer shall re-configure the casework arrangements to dimensions requiring 2-1/2" or less of filler at each end of wall-to-wall elevations, and to ensure a complete and satisfactory installation.

- G. The casework installer shall remove all debris, sawdust, scraps, and leave casework spaces clean.
- H. All casework must be installed by casework installer plumb and level, adjust all doors, drawers and hardware to comply with manufacturers specifications and operate properly.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15010 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. This Section contains General Provisions related specifically to the Mechanical Work.
 - 1. Quality Assurance.
 - 2. Terminology.
 - 3. Protection.
 - 4. Coordination and Sequencing.
 - 5. General Completion.
 - 6. Demolition.
 - 7. Cutting and Patching.
 - 8. Excavation for Mechanical Work.
 - 9. Concrete for Mechanical Work.
- B. Drawings and General Provisions of Contract, including General and Supplementary Conditions, apply to this section.

1.02 QUALITY ASSURANCE

- A. Laws, Permits, Inspections.
 - 1. Comply with latest revisions of New York State Uniform Fire Protection and Construction Code, NYSED Manual of Planning Standards, any Local Codes or Regulations that apply.
 - 2. Underwriters Laboratories label required for all electrical materials carrying 50 volts or more.
 - 3. Comply with New York State Energy Conservation Construction Code.
 - 4. Comply to requirements of drawings and specifications that are in excess of governing codes.
 - 5. Comply with section 1621 of the New York State Building Code for seismic requirements.
 - 6. Do not install work as specified or shown if in conflict with governing code. Notify Engineer and request direction.
 - 7. Pay all Inspection and Permit fees.
 - 8. Provide Certificate of Inspection from all governing authorities.
- B. Reference to technical society, organization, body or section made in accordance with the following abbreviations:
 - 1. AIA American Institute of Architects
 - 2. AMCA Air Moving and Conditioning Association, Inc.
 - 3. ANSI American National Standards Institute.
 - 4. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
 - 5. ASME American Society of Mechanical Engineers
 - 6. ASTM American Society of Testing Materials
 - 7. AWS American Welding Society Code
 - 8. AWWA American Water Works Association
 - 9. IEEE Institute of Electric and Electronics Engineers

10. NEC National Electric Code
 11. NEMA National Electrical Manufacturer's Association
 12. NFPA National Fire Protection Association
 13. NYBFU New York Board of Fire Underwriters
 14. NYCRR - Codes, Rules and Regulations of the State of New York.
 15. NSF - National Sanitation Foundation
 16. PDI - Plumbing and Drainage Institute.
 17. SMACNA Sheet Metal and Air Conditioning Contractors National Association
 18. UL Underwriters' Laboratories, Inc.
- C. Contractor submission of equivalent or substitute items other than those specified is at Contractor convenience only. If a substitution or equivalent is accepted, the Contractor shall coordinate the installation of the substitute or equivalent and make all associated changes required. The Contractor also waives any claim for additional costs associated with the substitute / equivalent which becomes apparent before, during or after installation. The Contractor agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution / equivalent.
- D. The Contractor shall, as part of his contract, furnish and install all equipment, materials, wiring accessories, and on-site installation of equipment as required by current standards of good practice.
- E. All materials and equipment to be furnished and installed shall be new and of first quality and be free from all defects.

1.03 TERMINOLOGY

- A. The following terminology and definitions are used on this project as related to the Mechanical Work.
1. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.
 2. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
 3. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 4. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
 5. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

6. Sewers: Refer to underground connections from building to street mains. Sewers begin at points 5 feet outside building wall.
7. Service Connections: Refer to underground connections from 5 feet outside building wall to street mains.
8. Underground Lines: Refer to piping buried in earth inside and within 5 feet outside building.
9. Building Lines: Refer to all other lines.
10. For other definitions refer to latest issue of New York State Plumbing Code, and all revisions.

1.04 PROTECTION

- A. Protect equipment from damage, including water, chemical, mechanical injury and theft.
- B. Replace damaged equipment or components.
- C. Close and waterproof between sleeves, openings, pipes and voids in walls, floors and foundations to prevent entrance of water or moisture.
- D. Holes made in fire walls, partitions, fire stops, shall be patched to maintain fire rating integrity.
- E. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris and moisture.
- F. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.
- G. Protect flanges, fittings, and piping specialties from moisture and dirt.
- H. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- I. If permanently installed air handler equipment/systems are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used in each unit and at each return air grille/opening, as determined by ASHRAE 52.2 Replace all unit filtration media with a Minimum Efficiency Reporting Value (MERV) of 13 immediately prior to occupancy and verify ductwork cleanliness; if ductwork is found contaminated, clean ductwork and associated air handling equipment and replace filtration media.

1.05 COORDINATION AND SEQUENCING

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for chases, slots and openings in building structure during progress of construction, to allow for mechanical installations.

- C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors shall be submitted and approved by the engineer.
- G. Coordinate installation of identifying devices after completion of covering and painting, where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.
- H. Coordination with other trades: Right-of-Way as follows:
 - 1. Light Fixtures.
 - 2. Drain Pipes and Vents.
 - 3. Ductwork.
 - 4. HVAC Piping.
 - 5. Domestic Water Piping.
 - 6. Electrical Conduit.
- I. Work in existing building.
 - 1. Verify existing locations of pipe, ductwork equipment and conduit in field.
 - 2. Extend existing systems as required for proper tie-in to new systems.
 - 3. Leave existing equipment to be reused in satisfactory working order.
 - 4. Remove from building all existing piping, ductwork, equipment and similar items which do not conform to new layout. Before disposing of these items, determine if Owner wishes to retain them.
- J. Changeovers and continuity of services.
 - 1. Make changeovers, tie-ins, removal, and perform similar work that affect operation of present building at times approved by Owner.
 - 2. Make temporary connections required to keep present building systems and equipment in operation.
 - 3. Prior to any shutdown of present building, have necessary materials at site.

1.06 GENERAL COMPLETION

- A. Oiling Equipment.
 - 1. Lubricate equipment and motors in accordance with manufacturer's requirements.
- B. Instructions to Owner's Representative.
 - 1. Give notice to Engineer when all systems are installed and operating.
 - 2. Obtain name of Owner's Representative to receive instructions.
 - 3. Schedule instructions of Owner's Representative by manufacturer's representative and instruct Owner in system installation and operation for:
 - a. Heating, Ventilating & Air Conditioning Equipment.
 - b. Fan equipment.
 - c. Pumps.
 - d. Temperature control.
 - e. Equipment lubrication.
 - f. Packaged systems.
- C. Provide Operation and Maintenance manuals in accordance with the requirements of Division 1 "Project Closeout" Section. Provide an instructional video to the owner of the training / maintenance instruction sessions with the owner.

1.07 PAINTING AND FINISHING

- A. Refer to "Painting" Section 09900 for field painting requirements.
- B. Damage and Touch-up: Repair marred and damaged factory painted finishes with materials and procedures to match original factory finish.

1.08 DEMOLITION

- A. Disconnect, demolish, and remove work specified under Division 15 and as indicated.
- B. Where pipe, ductwork, insulation or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.
- C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.
- D. Abandoned Work: Cut and remove buried pipe abandoned in place, 2 inches beyond the face of adjacent construction. Cap and patch surface to match existing finish.
- E. Removal: Remove indicated equipment from the project site.

- F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation. Add cap off and pressure test prior to putting back in service.

1.09 CUTTING AND PATCHING

- A. All cutting required to facilitate the proper installation of all work to be installed under Div. 15, shall be done by Div. 15 contractor.
- B. Cut, channel, chase and drill floors, walls, partitions, ceilings and other surfaces necessary for mechanical installations in the manner specified and approved by the architect. Perform cutting by skilled mechanics of the trades involved.
- C. Repair cut surfaces to match adjacent surfaces.

1.10 EXCAVATION FOR MECHANICAL WORK

- A. Description of Work: Types of excavation for mechanical related work specified in this section include:
 - 1. Underground mechanical utilities and services.
 - 2. Underground tanks, casings and equipment enclosures.
 - 3. Exterior water circulation and distribution systems.
- B. Project Conditions.
 - 1. Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Liabilities arising out of performance of work is responsibility of Contractor doing excavation.
 - 2. Protect persons from injury at excavations by barricades, warnings, and illumination.
 - 3. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install mechanical work on frozen excavation bases or subbases.

1.11 CONCRETE FOR MECHANICAL WORK.

- A. Types of concrete for mechanical related work specified in this section include:
 - 1. Lean concrete backfill to support mechanical work.
 - 2. Encasement of mechanical work.
 - 3. Mechanical equipment foundations and housekeeping pads.
 - 4. Inertia bases for isolation of mechanical work.
 - 5. Rough grouting in and around mechanical work.
 - 6. Patching concrete cuts to accommodate mechanical work.
 - 7. Thrust block.

1.12 REBATES

- A. The Division 15 Contractor shall assist the Owner in applying for any available rebates from manufacturer's, utility companies, etc. on equipment or materials installed under the contract. Provide all required documentation and assist in the completion of applications as required to complete the rebate process. All proceeds from rebates remain the property of the Owner.

PART 2 - PRODUCTS

Reference Section 03300.

PART 3 - EXECUTION

3.01 EXCAVATION - GENERAL

- A. Do not excavate for mechanical work until work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum.
- B. Excavate with vertical sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross bracing to sustain sides of excavation. Remove sheeting and cross bracing during backfilling wherever such removal would not endanger work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.
- C. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other mechanical work to provide minimum practical but adequate working clearances.
- D. Depth for direct support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand excavate bottom cut to accurate elevations, undercut at pipe hubs.
- E. Depth for subbase support: For large piping (6" pipe size and larger), tanks, and where indicated for other mechanical work, excavate for installation of subbase material in depth indicated or, if not otherwise indicated, 6" below bottom of work to be supported.
- F. Depth for unsatisfactory soil or rock conditions: Where directed, (because of unsatisfactory conditions at bottom of indicated excavation), excavate additional depth as directed to reach satisfactory conditions. Backfill with subbase material, compacted as directed, to indicated excavation depth.
- G. Store excavated material (temporarily) near excavation, in manner which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).

1. Dispose of excavated material which is either in excess of quantity needed for backfilling, or does not comply with requirements for backfill material.
 - a. Remove unused material from project site, and dispose of in lawful manner.

3.02 WATER CONTROL

- A. Maintain dry excavations for mechanical work, by removing water. Protect excavations from inflow of surface water. Pump inflow of ground water from excavations, protect excavations from inflow of ground water, by installing temporary sheeting and waterproofing as well as dewatering as required. Provide adequate barriers which will protect other excavations and below grade property from being damaged by water, sediment or erosion from or through mechanical work excavations. Need permit for dewatering - contractor to obtain and pay for.

3.03 BACKFILLING (REFERENCE 02200)

- A. Do not backfill until installed mechanical work has been tested and accepted, wherever testing is indicated.
- B. Install drainage fill where indicated, and tamp to uniform firm density.
- C. Backfill with finely graded subbase material to 6" above wrapped, coated and plastic piping and tanks, and to centerline of other tanks.
- D. Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials.
- E. Backfill simultaneously on opposite sides of mechanical work, and compact simultaneously, do not dislocate work from installed positions.
- F. Backfill excavations in 8" high courses of backfill material, uniformly compacted to the following densities (% of maximum density, ASTM D1557), using power-driven hand operated compaction equipment.
 1. Lawn and landscaped areas: 85% for cohesive soils, 90% for cohesionless soil.
 2. Paved areas and roadways: 90% for cohesive soils, 95% for cohesionless soils.
- G. Backfill to elevations matching adjacent grades, at time of backfilling excavations for mechanical work. Return surfaces to original condition.

- H. After covering piping with 6" layer of approved fill, employ General Contractor to backfill, compact excavations beneath:
 - 1. New foundations.
 - 2. Slabs on grade.
 - 3. Areas to be paved by General Contractor.

3.04 CONCRETE BASES

- A. Construct concrete equipment bases of dimensions required, but not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.

3.05 CONCRETE GENERAL

Reference Section 03300.

3.06 CONCRETE CURING AND PROTECTION

Reference Section 03300.

3.07 MISCELLANEOUS CONCRETE ITEMS

- A. Fill in holes and openings left in concrete structures for passage of work by trade 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.

3.08 CONCRETE SURFACE REPAIRS (REFERENCE 03300)

- A. Repair and patch areas with epoxy or non-shrink grout immediately after removal of forms, when acceptable to Architect/Engineer.
- B. Repair areas, except single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" 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 same manner as adjacent concrete.
- C. Use epoxy-based mortar for structural repairs, where directed by Architect/Engineer.
- D. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.09 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Quality Control: Owner's acceptable testing laboratory will perform sampling and testing during concrete placement, which may include the following, as directed by Engineer. This testing

does not relieve Contractor of responsibility of providing concrete in compliance with specifications. Contractor shall perform additional testing as necessary, at no expense to Owner, to ensure quality of concrete.

1. Sampling Fresh Concrete: ASTM.
2. Slump: ASTM, one test for each load at point of discharge.
3. Air Content: ASTM C 173, one for each set of compressive strength (specimens of freshly mixed concrete).
4. Compressive Strength: ASTM, one set for each 50 cu. yds. or fraction thereof of each class and type of concrete; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one retained for later testing if required.
5. Laboratory Cured Test Cylinders: ASTM.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15018 - MOTORS AND ELECTRICAL WORK

1. Internal electrical control devices that operate starters, controllers, etc. shall be furnished, installed, and wired under Division 15. Such devices shall be included but not necessarily limited to, devices connected to ducts, damper switches, float switches, electric thermostats, safety devices, limit switches, relays, push button controllers, selector switches, pilot lights, extra interlock contacts, etc.
2. Equipment starters and disconnects shall be provided by the mechanical contractor completely mounted and wired to internal controls and shall be wired to incoming and outgoing control connections. Should integral equipment starters, disconnects or control panels be shipped separately, the mechanical contractor shall be responsible for the proper installation and connections from equipment to same. Incoming and outgoing (line and load) power wiring to starters / disconnect switches shall be performed by the electrical contractor.
3. The integration of the existing temperature control system wiring and controls shall be the responsibility of the Contractor under Division 15. The Contractor shall be fully responsible for the satisfactory operation of new equipment with the temperature control system.
4. All control transformers, control devices, starters, and control wiring furnished shall be properly protected with fuse cutouts and fuses or circuit breakers to conform to the National Electric Code, latest edition. All work shall be performed by a licensed electrician.
5. Each piece of equipment shall be provided with permanent type laminated, black finish, white core, phenolic nameplate. Nameplates should indicate the name and number of the unit, voltage, and any interlock reference. Each starter furnished by the Contractor shall be provided with a permanent type laminated, black finish, white core phenolic nameplate. Nameplate shall indicate the name of the unit controlled and the voltage rating. Nameplate shall be secured with adhesives. Plastic tape type labels will not be accepted.
6. All equipment shall be provided with disconnect means (by Mechanical Contractor).
7. All wiring furnished and installed by the mechanical contractor shall be in strict accordance with the latest edition of the National Electrical Code and all State and Municipal Agencies having jurisdiction. Except as specified otherwise, minimum size wire shall be #14 AWG (control) and #12 AWG (power) and shall be run in rigid galvanized steel conduit except as noted hereinafter. All wire shall be Type THHN or as required by code. All conduit connections to motors shall be made with short lengths of neoprene jacketed galvanized flexible metallic conduit (liquitite).
8. All wire and cable shall be new, manufactured of soft drawn copper of not less than 98% conductivity, conforming to ASTM Specifications and the latest requirements of N.E.C. Wire, and cable shall have 600 volt insulation (unless otherwise noted or specified) of the type specified and shall be of the standard AWG sizes as called for on Drawings or specified.

9. The Contractor shall furnish all labor and material required for the installation of the systems. A brief description of the work is as follows:
- a. Furnish all electrical control wiring for the new equipment and controls.
 - b. Contractor shall apply final finish to insure uniformity.
 - c. All cutting, patching, and painting as required.
 - d. All controls for units as hereinbefore specified and disconnect switches.
 - e. Testing of all mechanical contractor installed wiring as directed.
 - f. Contractor shall perform all work as stated on the documents for fire alarm fan shutdown for all new applicable equipment, unless noted otherwise.
 - g. Contractor shall obtain an approved independent electrical inspection certificate, covering all work performed by an electrical inspection agency serving the locality of the project.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15021 - SEISMIC/VIBRATION ISOLATIONS FOR HVAC EQUIPMENT

1.01 PRODUCT DESCRIPTIONS

A. Specification:

1. Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cables must be pre-stretched to achieve a certified minimum modulus of elasticity. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cables assemblies shall have an Anchorage pre-approval AOPA@ Number from OSHPD in the State of California verifying the maximum certified load ratings. Cable assemblies shall be type **SCB** at the ceiling and the clevis bolt, **SCBH** between the hanger rod nut and the clevis or **SCBV** if clamped to a beam, all as manufactured by Mason Industries, Inc.
2. Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three (3) ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage pre-approval AOPA@ Number from OSHPD in the State of California. Rod clamp assemblies shall be type **SRC** or **UC** as manufactured by Mason Industries, Inc.
3. Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purposed performed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage pre-approval AOPA@ Number from OSHPD in the State of California. Clevis cross brace shall be type **CCB** as manufactured by Mason Industries, Inc.

PART 2 - EXECUTION

2.01 GENERAL

- A. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data.
- B. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or ductwork resulting in stresses or misalignment.

- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- D. Coordinate work with other trades to avoid rigid contact with the building.
- E. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractors expense.
- F. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitate by discrepancies after installation shall be at the responsible contractors expense.
- G. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractors expense.
- H. Overstressing of the building structure must not occur because of overhead support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:
 - 1. Flanges of the structural beams.
 - 2. Upper truss cords in bar joist construction.
 - 3. Cast in place inserts of wedge type drill-in concrete anchors.
- I. Cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.
- J. At locations where restraints are located, the support rods must be braced when necessary to accept compressive loads with braces.
- K. At all locations where restraints are attached to pipe clevis, the clevis cross bolt must be reinforced with braces.
- L. Where piping passes through walls, floors, or ceilings the vibration isolation manufacturer shall provide wall seals.
- M. Locate isolation hangers as near to the overhead support structure as possible.

2.02 VIBRATION ISOLATION OF PIPING

- A. Seismic Restraint of Piping
 - 1. Seismically restrain all piping listed below. Use cables if isolated. Restraints may be used on unisolated piping.
 - a. Fuel oil piping, gas piping.

2. For fuel oil and all gas piping transverse restraints must be 20' (6m) maximum and longitudinal restraints at 40' (12m) maximum spacing.
3. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
4. Connection to the structure must be made with non-friction connection (i.e. no AC@ clamps).

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.
 - 1. Submittals.
 - 2. Welder certification.
 - 3. Pipe joining materials and installation instructions common to piping systems.
 - 4. Piping specialties: Escutcheons, dielectric fittings, sleeves and seals.
 - 5. Identifying devices and labels.
 - 6. Nonshrink grout for equipment installations.
 - 7. Drip pans.
 - 8. Fire stopping.
 - 9. Pipe supports: Hangers, clamps, support spacing, building attachments, shields and saddles, flashing, miscellaneous materials, anchors.
 - 10. Field fabricated metal and wood equipment supports.
- B. Pipe and pipe fitting materials are specified in piping system sections.

1.02 RELATED DOCUMENTS

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

1.03 SUBMITTALS

- A. General - Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for following piping specialties:
 - 1. Mechanical sleeve seals.
 - 2. Identification materials and devices.
- C. Samples of color, lettering style and other graphic representation required for each identification material and device.
- D. Shop drawings detailing fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.
- E. Coordination drawings for access panel and door locations.
- F. Prepare coordination drawings according to Division 1 Section 01044-"Composite Drawings" to a 1/4 inch equals 1 foot scale or larger. Detail major elements, components and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence

and coordination of installations are important to the efficient flow of the Work. Include the following:

1. Proposed locations of piping, ductwork, equipment and materials. Include the following:
 - a. Planned piping layout, including valve and specialty locations and valve stem movement.
 - b. Planned duct systems layout, including elbows radii and duct accessories.
 - c. Clearances for installing and maintaining insulation.
 - d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
 - e. Equipment service connections and support details.
 - f. Exterior wall and foundation penetrations.
 - g. Fire-rated wall and floor penetrations.
 - h. Sizes and location of required concrete pads and bases.
- G. Floor plans, elevations and details to indicate penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
- H. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.
- I. Submit weld procedure specifications.

1.04 WELD AND WELDER CERTIFICATION

- A. Welder certificates signed by Contractor certifying that welders comply with requirements of this Section.
- B. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code - Steel".
 1. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
 1. Comply with provisions of ASME B31 Series "Code for Pressure Piping".

PART 2 - PRODUCTS

2.01 PIPE AND PIPE FITTINGS

- A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods. Joining methods and pipe installation shall be performed in complete accordance with section 1613 of the Building Code of New York State for building seismic type II, zone C.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.02 PIPE JOINING MATERIALS

- A. Refer to individual piping system specification Sections in Division 15 for special joining materials not listed below.
- B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8 inch maximum thickness, except where thickness or specific material is indicated.
 - a. Full-Face Type: for flat-face, Class 125 cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: for raised-face, Class 250 cast-iron and steel flanges.
 - 2. ASME B16.20 for grooved, ring-joint, steel flanges. Note that grooved, ring joint piping / accessories may be used for sprinkler or condenser water piping systems only.
 - 3. AWWA C110, rubber, flat face, 1/8 inch thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is indicated.
- D. Solder Filler Metal: ASTM B 32.
 - 1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95 percent) and silver (approximately 5 percent).
 - 3. Alloy E: Tin (approximately 95 percent) and copper (approximately 5 percent).
 - 4. Alloy HA: Tin-antimony-silver-copper-zinc.
 - 5. Alloy HB: Tin-antimony-silver-copper-nickel.
 - 6. Alloy Sb5: Tin (95 percent) and antimony (5 percent).
- E. Brazing Filler Metals: AWS A5.8.
 - 1. BCuP Series: Copper-phosphorus alloys.
 - 2. BAgl: Silver alloy.
- F. Welding Fill Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Flanged, Ductile-Iron Pipe Gasket, Bolts and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.
- H. Couplings: Iron body sleeve assembly, fabricated to match outside diameters of plain-end, pressure pipes.
 - 1. Sleeve: ASTM A 126, Class B, gray iron.
 - 2. Followers: ASTM A 47, Grade 32510 or ASTM A 536 ductile iron.
 - 3. Gaskets: Rubber.
 - 4. Bolts and Nuts: AWWA C111.
 - 5. Finish: Enamel paint.

2.03 PIPING SPECIALTIES

- A. Escutcheons: Manufactured wall, ceiling and floor plates; deep-pattern type, where required to conceal protruding fittings and sleeves.
1. Inside Diameter: Closely fit around pipe, tube and insulation of insulated piping.
 2. Outside Diameter: Completely cover opening.
 3. Cast Brass: One-piece, with set-screw.
 - a. Finish: Rough brass.
 - b. Finish: Polished chrome plate.
 4. Cast Brass: Split casting, with concealed hinge and set-screw.
 - a. Finish: Rough brass.
 - b. Finish: Polished chrome plate.
 5. Stamped Steel: One-piece, with set screw and chrome plated finish.
 6. Stamped Steel: One-piece with spring clips and chrome plated finish.
 7. Stamped Steel: Split plate with concealed hinge, set-screw, and chrome plated finish.
 8. Stamped Steel: Split plate with concealed hinge, spring clips and chrome plated finish.
 9. Cast-Iron Floor Plate: One piece casting.
- B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.
1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
 2. Insulating Material: Suitable for system fluid, pressure and temperature.
 3. Dielectric Unions: Factory-fabricated, union assembly, for 250 psig minimum working pressure at 180 deg F temperature.
 4. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system pressures.
 5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers and steel backing washers.
 - a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
 6. Dielectric Couplings: Galvanized steel coupling, having inert and non-corrosive, thermoplastic lining, with threaded ends and 300 psig minimum working pressure at 225 deg F temperature.
 7. Dielectric Nipples: Electroplated steel nipple, having inert and non-corrosive, thermoplastic lining, with combination of

plain or threaded end types and 300 psig working pressure at 225 deg F temperature.

- C. Mechanical Sleeve Seals: Modular, watertight, mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.
- D. Sleeves: The following materials are for wall, floor, slab and roof penetrations.
 - 1. Steel Sheet-Metal: 24 gage or heavier, galvanized sheet metal, round tube closed with welded longitudinal joint.
 - 2. Steel Pipe: ASTM A53, Type E, Grade A, Schedule 40, galvanized, plain ends.
 - 3. Cast-Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
 - 4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.
 - a. Penetrating Pipe Deflection: In accordance with International Building Code (latest edition), Chapter 16: seismic requirements, without leakage.
 - b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111 of housing and gasket size as required to fit penetrating pipe.
 - c. Pipe Sleeve: AWWA C151, ductile-iron pipe.
 - d. Housing-to-Sleeve Gasket: Rubber or neoprene, push-on type, of manufacturer's design.
 - 5. Cast-Iron Sleeve Fittings: Commercially-made, sleeve having integral clamping flange, with clamping ring, bolts and nuts for membrane flashing.
 - a. Underdeck Clamp: Clamping ring with set screws.

2.04 IDENTIFYING DEVICES AND LABELS

- A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. Where more than single type is specified for listed application, selection is Installer's option, but provide single selection for each product category.
- B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped; permanently fastened to equipment.
 - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.
 - 2. Location: An accessible and visible location.
- C. Snap-On Plastic Pipe Markers: Manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, conforming to ASME A13.1.

- D. Pressure-Sensitive Pipe Markers: Manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, conforming to ASME A13.1.
- E. Plastic Duct Markers: Manufacturer's standard laminated plastic, color coded duct markers. Conform to following color code:
1. Green: Cold air.
 2. Yellow: Hot air.
 3. Yellow/Green: Supply air.
 4. Blue: Exhaust, outside, return and mixed air.
 5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
 6. Nomenclature: Include following:
 - a. Direction of air flow.
 - b. Duct service (supply, return, exhaust, etc.).
 - c. Duct origin (from).
 - d. Duct destination (to).
 - e. Design cfm.
- F. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock: Grade ES-2, black surface, black phenolic core, with white (letter color) melamine subcore, except when other colors are indicated.
1. Fabricate in sizes required for message.
 2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
 3. Punch for mechanical fastening.
 4. Thickness: 1/16 inch, except as otherwise indicated.
 5. Thickness: 1/8 inch, except as otherwise indicated.
 6. Thickness: 1/16 inch, for units up to 20 square inches or 8-inches long; 1/8 inch for larger units.
 7. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.
- G. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:
1. Green: Cooling equipment and components.
 2. Yellow: Heating equipment and components.
 3. Yellow/Green: Combination cooling and heating equipment and components.
 4. Brown: Energy reclamation equipment and components.
 5. Blue: Equipment and components that do not meet any of above criteria.
 6. For hazardous equipment, use colors and designs recommended by ASME A13.1.
 7. Nomenclature: Include following, matching terminology on schedules as closely as possible:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and rpm.
 8. Size: Approximately 2-1/2 by 4 inches for control devices, dampers, and valves; and 4-1/2 by 6 inches for equipment.

H. Underground Type Plastic Line Marker.

1. Manufacturer's standard permanent, bright colored, continuous printed plastic tape, intended for direct burial service, not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried pipe.

I. Lettering and Graphics: Coordinate names, abbreviations and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system number as well as service such as "Boiler No. 3", "Air Supply No. 1H", or "Standpipe F12".

2.05 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi, 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

2.06 DRIP PANS

- A. Provide drip pans fabricated from corrosion resistant sheet metal with watertight joints, and with edges turned up 2-1/2 inches. Reinforce top, either by structural angles or by folding over according to size. Provide hole, gasket, and flange at low point for watertight joint and 1-inch drain line connection.

2.07 FIRE STOPPING

- A. Refer to Specification Section 15511 for details.

2.08 HORIZONTAL PIPING HANGERS AND SUPPORTS

- A. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports. Supports and hangers in conformance with International Building Code (latest edition), Chapter 16: seismic requirements shall be used. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper plated hangers and supports for copper piping systems. Provide spring hangers where piping is subject to vibration movement.

B. Adjustable steel clevises.

1. Material: Carbon steel, copper plated for copper piping.
2. Finish: Black or copper plated.

3. Adjustment: Hanger to be adjustable for vertical height of pipe without removing the pipe.

2.09 VERTICAL PIPING CLAMPS

- A. Two bolt riser clamp.
 1. Material: Carbon steel copper plated for copper piping.
 2. Finish: Black or copper plated.

2.10 HANGER ROD AND SPACING

ROD SIZE AND SPACING SCHEDULE (In accordance with NYSBC 1621)

<u>PIPE SIZE</u>	<u>ROD DIAMETER</u>
2" and smaller	3/8"
2-1/2" thru 3-1/2"	1/2"
4" thru 5"	5/8"
6" and over	3/4"

<u>TYPE</u>	<u>MAXIMUM SPACING</u>
Steel	10' - 0"
Copper	6' - 0"

Note: Cast Iron - support at every hub or coupling 5 ft. maximum spacing.

2.11 BUILDING ATTACHMENTS

- A. General: Except as otherwise indicated provide factory fabricated building attachments of one of the following types listed, selected by Installer to suit building substrate conditions. Select size of building attachments to suit hanger rods. Provide copper plated building attachments for copper piping systems. Provide the following where approved by International Building Code (latest edition), Chapter 16:
- B. On Structural Steel:
 1. For pipes 2" and smaller: C clamps with lock nuts similar to Grinnell figure 86.
 2. For pipes 5" and larger: Use beam clamps similar to Grinnell figure 228 or 292.
- C. On New Masonry:
 1. Use concrete inserts similar to Grinnell figure 281.
- D. On Existing Concrete:
 1. Use expansion case similar to Grinnell figure 117.
- E. On Wood:
 1. Use coach screw rods Grinnell figure 111. Ceiling flanges Grinnell figure 153, or fabricated angle clips. Use wood drive screws or lag bolts as fasteners.

2.12 SHIELDS AND SADDLES (Where approved by International Building Code (latest edition), Chapter 16:)

- A. General: For insulated piping.
- B. Shields: 16 gauge galvanized metal.
Unsul Coustic Corp. "Insul-Shield"
- C. Protection saddles:
 - 1. Hardwood block
 - 2. Steel saddle Grinnell 160 series

2.13 FLASHING MATERIALS

- A. General: Provide flashings for each penetration of mechanical systems through roofs or waterproof membranes.
- B. Molded Pipe Flashing: Compatible with single ply membranes with which it is used and manufactured by membrane manufacturer.
- C. Copper flashing: Provide cold-rolled sheet copper (ANSI/ASTM B 370), of proper temper for applications shown and required forming, coated on one side with not less than 0.06 lbs. per sq. ft. of antimony (ANSI/ASTM B 101, Type I, Class A), weighing 1.06 lbs. per sq. ft., except as otherwise indicated.
- D. Bituminous coating: FS TT-C-494, or MIL-C-18480, or SSPC-Paint 12, cold applied solvent type bituminous mastic coating for application in dry film thickness of 15 mils per coat.

2.14 MISCELLANEOUS MATERIALS

- A. Metal framing: Provide products complying with NEMA STD ML 1.
- B. Steel plates, shapes and bars: Provide products complying with ANSI/ASTM A 36.
- C. Heavy duty steel trapezes: Fabricate from steel shapes selected for loads required, weld steel in accordance with AWS standards.
- D. Pipe guides: Provide factory fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two section outer cylinder and base with a two section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

2.15 ANCHORS

- A. Fabricate pipe anchors from 3 x 3 x 1/2" angle.
- B. Use pipe protection saddles one size larger than piping.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General: All piping systems, components and their installation shall be in conformance with the International Building Code (latest edition), Chapter 16: for seismic requirements. Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15 specify piping installation requirements unique to the piping system.
- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordinate drawings.
- C. Install piping at indicated slope.
- D. Install components having pressure rating equal to or greater than system operating pressure.
- E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.
- F. Install piping free of sags and bends.
- G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.
- H. Install piping tight to slabs, beams, joists, columns, walls and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- I. Install piping to allow application of insulation plus 1-inch clearance around insulation.
- J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- K. Install fittings for changes in direction and branch connections.
- L. Install couplings according to manufacturer's printed instructions.
- M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wallboard partitions and suspended ceilings according to the following:
 - 1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw and polished chrome-plated finish. Use split-casting escutcheons where required, for existing piping.
 - 2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.
 - 3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.

4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips and chrome-plated finish.
 5. Piping in Utility Areas: Cast-brass or stamped-steel with set-screw or spring clips.
- N. Sleeves are required for core drilled holes.
- O. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs and where indicated.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.
 2. Build sleeves into new walls and slabs as work progresses.
 3. Install large enough sleeves to provide 1/4 inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Sheet-Metal Sleeves: For pipes 6 inches and larger, penetrating gypsum-board partitions.
 - b. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Flashing is specified in Division 7 Section "Flashing and Sheet Metal".
 - c. Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.
 4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants specified in Division 7 Section "Joint Sealants".
- Q. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeve and mechanical sleeve seals. Size sleeve for 1 inch annular clear space between pipe and sleeve for installation of mechanical seals.
1. Install steel pipe for sleeves smaller than 6 inches.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger.
 3. Assemble and install mechanical seals according to manufacturer's printed instructions.
- R. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.

- S. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- V. Piping Joint Construction: Joint pipe and fittings as follows and as specifically required in individual piping system specification Sections.
 - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - 3. Soldered Joints: Construct joints according to AWS "Soldering Manual", Chapter 22 "The Soldering of Pipe and Tube".
 - 4. Brazed Joints: Construct joints according to AWS "Brazing Manual", Chapter 28 "Pipe and Tube".
 - 5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:
 - a. Note the internal length of threads in fittings or valve ends and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
 - b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
 - c. Align threads at point of assembly.
 - d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
 - e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- W. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to "Quality Assurance" article.
- X. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
 - 1. Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment, according to manufacturer's printed instructions.
 - a. Plain-End Pipe and Socket-Type Fittings: Socket-joining.

- Z. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2 inches or smaller threaded pipe connection.
 2. Install flanges, in piping 2 1/2 inches and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
 3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials or dissimilar metals.
 4. Wet Piping Systems (Water and Steam): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.02 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to provide the maximum possible headroom, where mounting heights are not indicated. Equipment platforms, vibration isolation and restraints shall be provided and installed where described and shall be in conformance with International Building Code (latest edition), Chapter 16:
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.
- D. Install mechanical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
- E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.03 LABELING AND IDENTIFYING

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
 1. Plastic markers, with application systems. Install on pipe insulation segment where required for hot non-insulated pipes.
 2. Locate pipe markers as follows wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
 - a. Near each valve and control device.
 - b. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.

- c. Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
 - d. At access doors, manholes and similar access points that permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
 - f. Spaced at a maximum of 50 feet intervals along each run. Reduce intervals to 25 feet in congested areas of piping and equipment.
 - g. On piping above removable acoustical ceilings, except omit intermediately spaces markers.
3. During back-filling/top-soiling of each exterior underground piping systems, install continuous underground type plastic line marker, located directly over buried line at 6-inches to 8-inches below finished grade. Where multiple small lines are buried in common trench and do not exceed overall width of 16-inches, install single line marker. For tile fields and similar installations, mark only edge pipe lines of field.
- B. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.
- 1. Lettering Size: Minimum 1/4 inch high lettering for name of unit where viewing distance is less than 2 feet, 1/2 inch high for distance up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.
 - 2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.
- C. Duct Systems: Identify air supply, return, exhaust, intake and relief ducts with duct markers, or provide stenciled signs and arrows, showing duct system service and direction of flow.
- 1. Location: In each space where ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet.
- D. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.04 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Provide and install in conformance with International Building Code (latest edition), Chapter 16: Cut, fit and place miscellaneous metal supports accurately in location, alignment and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1 "Structural Welding Code - Steel".

3.05 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

- A. Cut, fit and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.06 GROUTING

- A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms for placement of grout, as required.
- D. Avoid air entrapment when placing grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases to provide a smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's printed instructions

3.07 DRIP PANS

- A. Locate drip pans under piping passing over or within 3 ft. horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, and weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1-inch drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

3.08 FIRESTOPPING

- A. See section 15511 for additional fire stopping requirements.

3.09 INSTALLATION OF BUILDING ATTACHMENTS

- A. Install building attachments at required locations in concrete, in wood or on structural steel for proper piping support. Space attachments within maximum piping span length indicated. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed, fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.10 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Supports / hangers shall conform to the requirements of International Building Code (latest edition), Chapter 16: Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Install hangers and supports of same type and style for grouped piping runs.
- C. Support fire water piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.
- E. Provisions for movement: International Building Code (latest edition), Chapter 16:
 - 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
 - 2. Load distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
 - 3. Pipe slopes: Install hangers and supports to provide indicated pipe slopes.
- F. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.11 SHIELDS AND SADDLES FOR INSULATED PIPING

- A. 4" and below use 16 gauge x 12 inch long shield with oversized hanger outside insulation.
- B. 6" and above use hardwood protection saddle with 16 gauge x 18 inch long shield with oversized hanger outside insulation.
- C. 6" and above use steel protection saddle. Fill void between shield and pipe with insulation. Cover with vapor barrier. Protect barrier with 16 gauge x 18 inch long shield with oversized hanger outside assembly.

3.12 INSTALLATION OF ANCHORS

- A. Install anchors at proper locations to prevent stresses and to prevent transfer of loading and stresses to connected equipment.
- B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure.

- C. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.
- D. Anchor spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.13 FLASHINGS

- A. Manufacturer's recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.
- B. Coat back side of flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent separation as recommended by manufacturer of metal.
- C. On vertical surfaces, lap flashings minimum of 3".
- D. On sloping surfaces, for slopes of not less than 6" in 12", lap unsealed flashings minimum of 6".
- E. For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges minimum of 6" for embedment.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15055 - PAINTING OF MECHANICAL WORK

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Types of painting of mechanical related work specified in this section include the following:
 - 1. Exposed piping systems.
 - 2. Exposed ductwork systems.
 - 3. Steel supports, hangers and rods.
- B. The scope of painting to be applied as part of the work under Division 15 shall consist of the following:
 - 1. Paint exposed mechanical work throughout entire project including piping, ductwork, and terminal HVAC equipment.
 - 2. Paint uninsulated ductwork and equipment.
 - 3. Paint exposed NON insulated pipe, black steel such as pipe hangers, supporting steel, tanks, and equipment having no prime or only a prime coat finish.

1.02 SUBMITTALS

- A. Submit manufacturer's technical information, including analysis of ingredients and application instructions for products used in painting work.
- B. Certification by the manufacturer that products supplied comply with State VOC Regulations

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver painting materials to job site in original, new and unopened containers bearing manufacturer's name and label showing the following information:
 - 1. Name and title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Contents by volume, for major pigments and vehicles.
 - 4. Thinning instructions.
 - 5. Application instructions.
 - 6. Color name and number.
- B. Store materials in approved fire-safe location with adequate ventilation. Area must be kept clean.

1.04 PROJECT CONDITIONS

- A. Comply with governing regulations concerning use of and conditions for application of paint. Comply with manufacturer's recommendations and instructions. Do not apply paint in unfavorable conditions of temperature, moisture (including humidity) or ambient contamination (dust and other pollutants).

PART 2 - PRODUCTS

2.01 GENERAL PAINTING PRODUCT REQUIREMENTS

- A. Painting products based on a system by Rust-Oleum. Equivalent systems by Devoe and Pratt and Lambert are acceptable.
- B. Steel surfaces - normal temperatures:
 - 1. First Coat - Rust-Oleum or equal Red Primer.
 - 2. Second Coat - Rust-Oleum or equal Zinc Chromate Rust-Inhibitive Primer.
 - 3. Third Coat - Rust-Oleum industrial enamels, finish color as directed.
- C. Steel surfaces - elevated temperatures above 150 deg. F.
 - 1. First Coat - Rust-Oleum or equal heat resistant primer.
 - 2. Second Coat - Rust-Oleum or equal heat resistant aluminum.
 - 3. Machinery, equipment and apparatus having factory applied prime coat shall be painted as specified above except omit first coat.
- D. Exposed canvas on pipe and equipment insulation:
 - 1. First Coat - Primer, Rust-Oleum primer-sealer.
 - 2. Second and third coats - Rust-Oleum Acrylic Series.
 - 3. Colors as directed.
- E. Vehicles and thinners: Comply with governing regulations and recognized safe practices in handling, use and drying of paint vehicles and thinners. Compatibility of paint products is the Contractor's exclusive responsibility. Select paint products to ensure freedom from problems relating to vehicles and thinners of type and within limits recommended by paint manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

- A. Clean surfaces before applying paint products. Remove oil and grease prior to mechanical cleaning. Comply with paint products manufacturer's instructions for surface cleaning and preparation.

Remove surface applied accessories which are not to be painted, and reinstall after completion of painting. Protect non-removable items not to be painted, by covering with paper or plastic film.

- B. Ferrous metal surfaces: Remove mill scale and loose rust on surfaces which are not zinc coated or shop/factory prime coated.
 - 1. Clean shop applied prime coats on metal surfaces, and repair (touch-up) prime coats wherever abraded or otherwise damaged, prior to application of paint system.
- C. Zinc coated surfaces: Clean with non-petroleum based solvent. Wash with copper sulfate solution and flush with water, unless surface has been pre-treated, or unless treatment is not recommended by manufacturer of prime coat.

3.02 PAINT SYSTEM APPLICATION

- A. Comply with manufacturer's recommendations for mixing or stirring paint products immediately before application.
- B. Application limitations: Paint every accessible surface of each unit of work indicated to be painted, regardless of whether in location recognized as "concealed" or "exposed" except as otherwise indicated.
 - 1. Omit painting of ductwork and insulated piping above removable ceilings, but apply paint system to pipe hangers, duct hangers and similar unprotected ferrous materials.
 - 2. Omit painting on machined sliding surfaces and rotating shafts of equipment, and on nonferrous finished metals including chrome plate, stainless steel, special anodized aluminum, brass/bronze and copper, and on plastics and similar finished materials, except where specifically indicated to be color-coded by painting.
 - 3. Omit painting on required name plates, labels, identification tags, signs, markers, printed instructions, performance ratings, flow diagrams and similar text and graphics, located within the scope of work indicated to receive paint application.
 - 4. Omit specified prime coat of paint system for metal surfaces where surface has shop applied prime coat of equivalent quality. Apply prime coat on other surfaces to be painted, comply with paint manufacturer's instructions for prime coating where not otherwise indicated. Apply additional prime coats where suction spots or unsealed areas appear.
- C. Apply paint in accordance with manufacturer's directions. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance.

Apply paint at edges, corners, joints, welds and exposed fasteners in manner which will ensure dry-film thickness equal to that of flat surfaces. Allow sufficient time between successive coats for proper drying (comply with manufacturer's drying instructions).

 - 1. Number of coats: Number indicated is minimum number, apply as many coats as are necessary to cover.

2. Coating thickness: Apply paint in uniform coats without thinning in application thickness recommended by manufacturer for each coat.
3. Apply paint in smooth finish without noticeable texture, cloudiness, spotting, holidays, laps, brush marks, runs, sags, ripples, ropiness and other surface imperfections.

3.03 CLEAN UP AND PROTECTION, PAINTING

- A. During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day. Do not leave in paint storage area.
- B. Spattered surfaces: Upon completion of painting work, clean paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting work. Correct damage by cleaning, repairing or replacing and repainting as directed. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings installed for protection of work not to be painted, after completion of painting operations. At completion of work by other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15100 - VALVES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of valves required by this section is indicated on drawings and/or specified in other Division 15 sections.
- B. Types of valves specified in this section include the following:
 - 1. Gate valves.
 - 2. Globe valves
 - 3. Drain valves.
 - 4. Ball valves.
 - 5. Butterfly valves (where specifically approved by engineer only).
 - 6. Check valves.
 - a. Wafer Check (where specifically approved by engineer only).

1.03 QUALITY ASSURANCE

- A. Marking of valves - comply with MSS SP-25.
- B. Valve dimensions - for face-to-face and end-to-end dimensions of flanged or welding end valve bodies, comply with ANSI B16.10.
- C. ASME Compliance: ASME 1331.9 for Building Services Piping.
- D. Valve types. Provide valves of same type by same manufacturer.

1.04 SUBMITTALS

- A. Product data - submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valve schedule showing manufacturer's figure number, size, location and valve features for each required valve.
- B. Maintenance data - submit maintenance data and spare parts lists for each type of valve. Include this data in Maintenance Manual.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle valves and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged valves or components, replace with new.
- B. Store valves and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide factory fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated, provide proper selection as determined by installer to comply with installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is engineer's option.
- B. Valve Features
 - 1. Bypass- when shown provide manufacturer's standard bypass piping and valving.
 - 2. Drain - when shown provide threaded pipe plugs complying with Division 15 "Hot & Chilled water piping" section.
 - 3. Flanged - valve flanged complying with ANSI B16.1 (cast iron), ANSI B16.5, (steel), or ANSI B16.24 (bronze).
 - 4. Threaded - valve ends complying with ANSI B2.1
 - 5. Solder joint - valve ends complying with ANSI B16.18.
 - 6. Trim - fabricate pressure containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry.
 - 7. Renewable seat - design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.
 - 8. Extended stem - increase stem length 2" minimum, to accommodate insulation applied over valve.
- C. Valve Definitions
 - 1. Mechanical actuator - factory fabricated gears, gear enclosure, external chain attachment and chain designed to provide mechanical advantage in operating valve.
 - 2. Bonnet - part of gate or globe valve through which stem passes to valve body, and attached to valve body by screws, bolts union, or welding.
 - 3. Solid wedge - one piece tapered disc in gate valve, designed for contact on both sides.
 - 4. Outside screw and yoke (OS&Y) - stem and handwheel designed to rise out of bonnet or yoke as valve is operated from closed to open position.
 - 5. Inside screw, non-rising stem - stem and handwheel designed to rotate without rising when valve is operated from closed to open position.
 - 6. Tight shutoff - butterfly valve designed for flow regulation, and manufactured to be tight in closed position.

2.02 GLOBE VALVES

- A. Packing - select valves designed for repacking under pressure when fully opened, equipped with packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened, and equipped with gland follower.
- B. Composition discs - where required, provide suitable material for intended service. For stem throttling service, fit composition disc valve with throttling nut. For metal seated globe valves, provide hardened stainless steel disc and seat ring.

- C. Comply with the following standards:
1. Cast iron valves - MSS SP-85.
 2. Bronze valves - MSS SP-80.
 3. Steel valves - ANSI B16.34.
- D. For HVAC hot and chilled water service:
1. Threaded ends 2" and smaller - Class 150, bronze body, union bonnet, rising stem, composition disc.
 2. Soldered ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc.
 3. Flanged ends 2 1/2" and larger - Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc.
- E. Manufacturer - subject to compliance with requirements, provide globe valves of one of the following:
1. Jenkins Bros, A Corp.
 2. Kennedy Valve
 3. Stockham Valves and Fittings, Inc.

2.03 DRAIN VALVES

- A. For low pressure drainage service:
1. Threaded ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc, 3/4" hose outlet connection.
 2. Soldered ends 2" and smaller - Class 125, bronze body, screwed bonnet, rising stem, composition disc, 3/4" hose outlet connection.
- B. Manufacturer - subject to compliance with requirements, provide drain valves of one of the following:
1. NIBCO, Inc.
 2. Watts

2.04 BALL VALVES

- A. Comply with the following standards:
1. Cast iron valves - MSS SP-72.
 2. Steel valves - ANSI B16.34.
- B. For HVAC hot and chilled water service:
1. Threaded ends 2" and smaller - Class 125, bronze 2 piece body, full port, bronze ball, bronze stem.
 2. Soldered ends 2" and smaller - Class 125, bronze 2 piece body, full port, bronze ball, bronze stem.
- C. Manufacturer - subject to compliance with requirements, provide ball valves of one of the following:
1. Jenkins Bros.
 2. Stockham Valves & Fittings
 3. Watts

2.05 BUTTERFLY VALVES (only where specifically approved by the engineer)

- A. General - comply with MSS SP-67. Valves to be tight shutoff.

Where butterfly valves are used as shutoffs for terminal or equipment removal or repair, select lug type valves. Select wafer type valves for other applications. Provide gear operators on butterfly valves 8" and larger.

- B. For HVAC hot and chilled water service:
 - 1. Lug type 3" and larger - Class 150, ductile iron body, lever operated, cadmium plated ductile iron disc, Type 316 stainless steel stem, EPT or EPDM seat.
- C. Manufacturer - subject to compliance with requirements, provide butterfly valves of one of the following:
 - 1. Demco Inc.
 - 2. Jenkins Bros., A Corp.
 - 3. Mark Controls Corp., MCC Centerline.
 - 4. Stockham Valves and Fittings, Inc.
 - 5. Crane Co., Valve Division

2.06 WAFER CHECK VALVES (only where specifically approved by the engineer)

- A. General - provide wafer style, butterfly type, spring actuated check valves designed to be installed with gaskets between two standard Class 125 flanges. Construct iron body valves with pressure containing parts of materials conforming to ANSI/ASTM A-126, Grade B. Support hanger pins on both ends by removable side plugs.
- B. For water service:
 - 1. 2" and larger - Class 125, cast iron body, stainless steel trim, bronze disc, Buna-N seal.
- C. Manufacturer - subject to compliance with requirements, provide wafer check valves of one of the following:
 - 1. Bell & Gossett, ITT Fluid Handling Div.
 - 2. Metraflex Co.
 - 3. NIBCO, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General - except as otherwise indicated, comply with the following requirements:
 - 1. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
 - 2. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose end adapter for each valve that must be installed with stem below horizontal plane.
- B. Insulation - where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation.
- C. Applications subject to shock - install valves with bodies of metal other than cast iron where thermal or mechanical shock is

indicated or can be expected to occur.

- D. Applications subject to corrosion - do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- E. Mechanical actuators - install mechanical actuators with chain operators where indicated, and where valves 4" and larger are mounted more than 7'-0" above floor in mechanical rooms, boiler rooms, and where recommended by valve manufacturer because of valve size, pressure differential or other operating condition making manual operation difficult.
- F. Selection of valve ends (pipe connections) - except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.
 - 1. Copper tube size 2" and smaller - soldered joint valves except ball valves used in plumbing systems.
 - 2. Steel pipe, size 2" and smaller - threaded valves.
 - 3. Pipe size 2 1/2" and larger - flanged valves.
- G. Valve system - select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- H. Non-metallic disc - limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- I. Renewable seats - select and install valves with renewable seats, except where otherwise indicated.
- J. Fluid control - except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.
- K. Installation of Check valves: Wafer check valves - install between two flanges in horizontal or vertical position for proper direction of flow.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15215 - VIBRATION ISOLATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.
- B. This section is a Division 15 Basic Materials and Methods section, and is a part of each Division 15 section making reference to vibration isolation products specified herein. Vibration isolation devices shall conform to the seismic requirements of section 1613 of the New York State Building Code. Isolators shall allow the amount of movement required by this code and shall be equipped with limit stops as required by this code.

1.02 DESCRIPTION OF WORK

- A. Extent of vibration isolation work required by this section is indicated on drawings and schedules, and/or specified in other Division 15 sections.
- B. Types of vibration isolation products specified in this section include the following:
 - 1. Fiberglass Pad and Shapes
 - 2. Neoprene Pads
 - 3. Cork/Neoprene Pads
 - 4. Equipment Rails
 - 5. Fabricated Equipment Bases
 - 6. Roof Curb Isolators
 - 7. Isolation Hangers
 - 8. Riser Isolators
 - 9. Riser Support Isolators
 - 10. Flexible Duct Connectors
 - 11. Flexible Pipe Connectors
- C. Vibration isolation products furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 15 sections.
- D. Refer to other sections of these specifications for equipment foundations, hangers, sealants, gaskets and other work related to vibration isolation work.

1.03 QUALITY ASSURANCE

- A. Product qualification - provide each type of vibration isolation unit produced by specialized manufacturer, with not less than 5 years successful experience in production of units similar to those required for project.
 - 1. Except as otherwise indicated, obtain support isolation

1.04 SUBMITTALS

- A. Product data - submit manufacturer's specifications, detailed drawings, performance characteristics data and installation instructions for each type of unit required.
 - 1. Include data for each type and size of unit, showing isolation efficiency, stiffness, natural frequency and transmissibility at lowest operating speed of equipment.
 - 2. Where required, include independent test agencies certified report of test results for each type of unit.
 - 3. For spring units, show wire size, spring diameter, free height, solid-compression height, operating height, fatigue characteristics and ratio of horizontal to vertical stiffness.
 - 4. For spring and pad type units, show basis of spring rate selection for range of loading weights.
 - 5. Include performance certifications where required.
- B. Shop drawings - submit shop drawings showing structural design and details of inertia bases, steel beam bases and other custom fabricated work not covered by manufacturer's submitted data.
 - 1. Furnish templates to fabricators of equipment bases, foundations and other support systems, as needed for coordination of vibration isolation units with other work.
- C. Submit shop drawings indicating scope of vibration isolation work and locations of units and flexible connections. Include support isolation points for piping and ductwork including risers, air housings and inertia bases.
 - 1. Include schedule of units, showing size or manufacturer's part number, and weight supported and resulting deflection of each unit.

PART 2 - PRODUCTS

2.01 ISOLATION MATERIALS AND SUPPORT UNITS

- A. Fiberglass pads and shapes - glass fiber of not more than 0.18 mil diameter, produced by multiple-flame attenuation process, molded with manufacturer's standard fillers and binders through 10 compression cycles at 3 times rated load bearing capacity, to achieve natural frequency of not more than 12 Hertz, in thicknesses and shapes required for use in vibration isolation units.
- B. Neoprene pads - oil resistant neoprene sheets, of manufacturer's standard hardness and cross ribbed pattern, designed for neoprene in shear type vibration isolation, and in thicknesses required.
- C. Cork/Neoprene pads - close grained composition cork sheet, laminated between 2 sheets of ribbed oil resistant neoprene, in thicknesses required.
- D. Vibration isolation products furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 15 sections.
- E. Refer to other sections of these specifications for equipment foundations, hangers, sealants, gaskets and other work related to vibration isolation work.

- F. Equipment rails - where rails or beams are indicated for use with isolator units to support equipment, provide steel beams complying with ANSI/ASTM A36, with minimum depth of 6" or $0.08 \times$ span of beam between isolators (whichever is greater). Provide welded bracket at each end of beams, and anchor each end to spring isolator unit. Provide bolt holes in beams matching anchor bolt holes in equipment. Provide beams of section modulus indicated or, if not indicated, selected for normal-weight equipment loading to limit static load stress to 16,000 psi.
1. Except as otherwise indicated, position equipment on equipment rails so that load will be equally supported by isolator units.
- G. Fabricated equipment bases - where supplementary bases are indicated for use with isolator units to support equipment (base not integral with equipment), provide welded unit, fabricated of structural steel shapes, plates and bars complying with ANSI/ASTM A36, as shown. Provide welded support brackets at points indicated, and anchor base to spring isolator units. Except as otherwise indicated, arrange brackets to result in the lowest possible mounting height for equipment. Provide bolt holes in base matching anchor bolt holes in equipment.
1. Where indicated, provide auxiliary steel base for support of motor, mounted on equipment base with slotted anchor bolt holes for adjustment of motor position.
 2. Where sizes of base framing members are not indicated, fabricate base with depth of structure not less than $0.10 \times$ longest span of base, rigidly braced to support equipment without deflections or distortions which would be detrimental to equipment or equipment performances.
- G. Roof-curb isolators - fabricated frame units sized to match roof curbs as shown, formed with isolation springs between extruded aluminum upper and lower sections, which are shaped and positioned to prevent metal-to-metal contact. Provide continuous airtight and waterproof seal between upper and lower extrusions. Include provisions for anchorage of frame unit to roof curb, and for anchorage of equipment to unit.
- H. Isolation hangers - hanger units formed with brackets and including manufacturer's standard compression isolators of type indicated. Design brackets for 5 times rated loading of units. Fabricate units to accept misalignment of suspension members, and for use with either rod or strap type members and including acoustical washers to prevent metal-to-metal contacts.
1. Provide vibration isolation spring with cap and pad type isolator, securely retained in unit.
 2. Provide neoprene pad, securely retained in unit.
 3. Provide fiberglass pad or shape, securely retained in unit, with threaded metal top plate.
 4. Provide removable spacer in each unit, to limit deflection during installation to rated-load deflection.
- I. Riser isolators - manufacturer's standard pad type isolator bonded to steel plate, formed for welding to pipe sleeve extension.

- J. Riser support isolators - manufacturer's standard pad type isolator laminated between two formed steel plate members, one for welding to pipe sleeve extension and other for welding to pipe riser.
- K. Flexible duct connectors - laminated flexible sheet of cotton duct and sheet elastomer (butyl, neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated. Form connectors with full faced flanges and accordin bellows to perform as flexible isolation unit, and of manufacturer's standard length for each size unless otherwise indicated. Equip each unit with galvanized steel retaining rings for airtight connection with ductwork.
- L. Flexible pipe connectors:
 - 1. For non-ferrous piping, provide bronze hose covered with bronze wire braid with copper tube ends or bronze flanged ends, brase-welded to hose.
 - 2. For ferrous piping, provide stainless steel hose covered with stainless steel wire braid with NPT steel nipples or 150 psi ANSI flanges, welded to hose.
 - 3. Rubber flexible pipe connectors - provide of rubber and butyl construction with integral full faced duck and butyl flanges, internally steel wire reinforced, and furnished complete with steel retaining rings. Select with temperature and pressure ratings to suit intended service.
 - 4. Manufacturer - subject to compliance with requirements, provide vibration isolation products of one of the following:
 - a. Korfund Dynamics Corp.
 - b. Mason Industries, Inc.
 - c. Vibration Eliminator Co., Inc.
 - d. Vibration Mountings and Controls, Inc.

PART 3 - EXECUTION

3.01 PERFORMANCE OF ISOLATORS

- A. General - comply with minimum static deflections recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers, including definitions of critical and noncritical locations, for selection and application of vibration isolation materials and units as indicated.
- B. Manufacturer's recommendations - except as otherwise indicated, comply with manufacturer's recommendations for selection and application of vibration isolation materials and units.

3.02 APPLICATIONS

- A. General - except as otherwise indicated, apply the following types of vibration isolators at indicated locations or for indicated items of equipment. Selection is Installer's option where more than one type is indicated.
- B. Neoprene pad type isolators - install where the following equipment is indicated:
 - 1. Floor mounted air handling units, in noncritical locations.

- C. Equipment rails and spring isolators - install where the following floor mounted equipment is indicated:
1. Air handling units, 7 1/2 H.P. and larger.
 2. Centrifugal fans, 7 1/2 H.P. and larger.
- D. Fabricated equipment base and spring isolators - install where the following equipment is indicated:
1. Centrifugal fans.
 2. Reciprocating refrigeration compressor, in noncritical locations.
- E. Roof curb isolators - install where the following equipment is located on roof curbs over critical locations:
1. Air handling units.
 2. Rooftop air conditioning units.
 3. Fan or blower units, of more than 1.5 H.P.
- F. Isolation hangers - install where the following suspended equipment is indicated:
1. Package air handling units.
 2. Pipe over 1" pipe size, located in mechanical equipment rooms and each run connected to vibration isolation mounted equipment for a distance of 100 diameters but not less than 50' - 0".
 3. Ductwork (except flexible ductwork), located in mechanical equipment rooms, and each run connected to vibration isolation mounted equipment for a distance of 50' - 0".
 4. Sound traps in ductwork.
 5. Ductwork, where air velocity is 3000 fpm or greater.
- G. Riser isolators - install where the following risers pass through floors and roofs, provide support type where riser support is required:
1. Pipe risers.
 2. Pipe risers, within 50' - 0" of connection with vibration isolation mounted equipment.
 3. Pipe risers, in critical locations.
 4. Pipe risers, 2" pipe size and larger, in critical locations.
 5. Ductwork risers, in critical locations.
 6. Ductwork risers, where air velocity is 3000 fpm or greater.
 7. Ductwork risers, within 50' - 0" of connection with vibration isolation mounted equipment.
- H. Flexible duct connectors - install at the following ductwork connections:
1. Connections with vibration isolation mounted air handling equipment.
 2. Connections with fixed wall louvers for air intake and exhausts.
 3. Where ductwork, 1.0 square foot and greater, changes directions in critical locations.
- I. Flexible pipe connectors - install in piping systems at the following location:
1. Connections, 3/4" pipe size and larger, with vibration isolation mounted equipment.

3.03 INSTALLATION

- A. General - except as otherwise indicated, comply with manufacturer's instructions for installation and load application to vibration isolation materials and units. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading, and are not short circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary protection against overloading during installation.
- B. Anchor and attach units to substrate and equipment as required for secure operation and to prevent displacement by normal forces, and as indicated.
- C. Adjust leveling devices as required to distribute loading uniformly onto isolators. Shim units as required where leveling devices cannot be used to distribute loading properly.
- D. Locate isolation hangers as near overhead support structure as possible.
- E. Weld riser isolator units in place as required to prevent displacement from loading and operations.
- F. Bond flanges of flexible duct connectors to ducts and housings to provide airtight connections. Seal seams and penetrations to prevent air leakage.
- G. Flexible pipe connectors - install on equipment side of shutoff valves, horizontally and parallel to equipment shafts wherever possible.

3.04 DEFLECTION MEASUREMENTS

- A. Upon completion of vibration isolation work, prepare report showing measured equipment deflections for each major item of equipment as indicated.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15250 - MECHANICAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Extent of mechanical insulation work required by this section is indicated on Drawings and by requirements of this section.
- B. Types of insulation and accessories specified in this section include the following:
 - 1. Type P-1, Sectional molded glass fiber pipe insulation.
 - 2. Type P-2, Sectional rigid foam glass pipe insulation.
 - 3. Type P-3, Flexible elastomeric cellular pipe insulation.
 - 3. Type P-5, Aluminum jacketing for piping
 - 4. Type P-6, Hydrophobic 'pourable' underground pipe insulation
 - 5. Type D-2, Flexible glass fiber blanket-aluminum foil facing.
 - 6. Type D-4, Aluminum jacketing for ductwork.

1.02 QUALITY ASSURANCE

- A. Fire Hazard Classification: In accordance with ASTM E-84.
- B. NFPA 255 and UL 723, for insulation systems, including insulation, adhesives and coverings, not to exceed the following:
 - 1. Flame spread 25.
 - 2. Fuel contributed 50.
 - 3. Smoke developed 50.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturers specification sheets, installation instructions, fire and smoke ratings. Submit schedule matching insulation type to mechanical systems and equipment.

PART 2 - PRODUCTS

2.01 INSULATION - TYPE P1

- A. Sectional Molded Glass Fiber Pipe Insulation: Minimum density 4.5 pounds per cubic foot. Factory applied jacket consists of white, flame retardant jacket of .001 inch minimum aluminum foil, laminated to glass fiber reinforced kraft paper with a flame retardant snuffer type adhesive. Jacket has minimum 1-1/2 inch longitudinal sealing lap. Minimum circumferential sealing strips, 3 inches wide.
- B. Fittings Valves and Flanges: Molded, precut, or segmental insulation equal in thickness to adjoining pipe insulation. Alternate, hydraulic-setting insulating cement. Surface finish pre-molded PVC fitting cover system. Alternate: fitting mastic, fiberglass, reinforcing strips and top coat of fitting mastic.

C. Manufacturers:

1. Certain Teed
2. Knauf Fiberglass
3. Schuler
4. Owens-Corning
5. U.S.G.

2.02 INSULATION - TYPE P2

- A. Sectional, Rigid, Foamed Glass Pipe Insulation: Minimum density 8.5 pounds per cubic foot.
- B. Fittings, Valves, and Flanges: Molded or segmental foamed glass insulation equal in thickness to adjoining pipe insulation.
- C. Exposed and Concealed Pipe: If exposed to weather, finish additionally with .016 inch embossed aluminum jacket, secured with 3/4 inch by .015 inch aluminum strappings and seals.
- D. Fittings, Valves, and Flanges: Insulate with preformed or mitered segments of foamed glass, wired, or taped in place and finished with 2 coats of vinyl fitting mastic with glass fabric reinforcement between coats.
- E. Manufacturer: Pittsburgh Corning Corp.

2.03 INSULATION TYPE P-3

- A. Black flexible closed cell foamed elastomeric pipe insulation with inner and outer surface skin, extruded tubing. Water permeability .17 to .28 perm-inch; water absorption 3 to 10 percent.
- B. Manufacturers:
 1. Armstrong
 2. Rubatex Corp.

2.04 ALUMINUM JACKETING FOR PIPING - TYPE P5

- A. Jacketing: Aluminum roll, Type 3003, 0.016 inch thick, 36 inches wide with moisture barrier for cold applications, without moisture barrier for hot applications.
- B. Fittings: Aluminum, preformed for tees, valves, 90 degree and 45 degree elbows: Childers ELL JAC or Premetco International.

2.05 HYDROPHOBIC 'POURABLE' FOR UNDERGROUND PIPING - TYPE P6

- A. Pourable: 100% Calcium Carbonate approximately 60-62 lbs/ sq ft bulk density with 4-6 mil thick polyethylene top vapor barrier.
- B. Manufacturer:
 1. Dritherm International, Inc.

2.06 INSULATION - TYPE D2

- A. Flexible glass fiber duct blanket. Minimum density: 1 pound per cubic foot.
- B. Facing: Aluminum foil, minimum .001 inches thick, reinforced with glass fiber yarn mesh and laminated to 40 pound permanently treated, fire-resistant kraft.
- C. Manufacturers:
 - 1. Certain Teed
 - 2. Knauf Fiberglass
 - 3. Schuller
 - 4. Owens-Corning
 - 5. U.S.G.

2.07 ALUMINUM JACKETING FOR DUCTWORK D-4

- A. Jacketing: Aluminum preformed, Type 3003, 0.016 inch thick rolls with moisture barrier for cold applications, without moisture barrier for hot applications. [Childers] [Premetco International].
- B. Stainless Steel Strip: AISI Type 301, 0.015 inches thick, 1/2 inch wide, No. 5 edge, annealed, embossed with "NON-ASBESTOS".
- C. Strapping Seals: AISI Type 302, stainless steel, 1/2 inch wide. Interlaken 44.
- D. Adhesive: Silicone rubber sealant. General Electric RTV. Dow Corning. Polymer One Sealant.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Apply insulation in accordance with the Schedule of Insulation at the end of this Section.
- B. Use only insulation and finish materials including adhesives, cements, and mastics which conform to the requirements of all local codes and ordinances.
- C. Fire resistant adhesive is highly flammable in liquid form. Eliminate welding, smoking, or other sources of ignition during application.
- D. Apply insulation after all piping pressure tests, as described in Piping Installation Procedure, have been completed.
- E. Clean surfaces of loose scale, dirt, oil, and other foreign matter and dry prior to insulating.
- F. Apply insulation to completely cover piping surface. Do not insulate over weld certification stamps.
- G. "Exposed" as used in this section means exposed to view. "Concealed" means concealed to view such as in furred chases or

above suspended ceiling. Penthouse and equipment rooms are considered exposed locations.

- H. Fill surface imperfections in the insulation such as chipped edges, small joints or cracks, and small voids or holes with appropriate insulation material and smooth with skim coat of hydraulic-setting insulating cement. Vapor barriers shall be continuous and unbroken at hanger installations.
- I. Fit inside diameter of insulation sections or segments to outside curvature of pipe or previous insulation layer.
- J. Where standard insulation shapes are not available, cut, score, or miter segments of appropriate block to fit contour of pipe. Stagger joints of adjoining segments. Fit insulation carefully and secure with No. 20 gage galvanized annealed steel wire. Finish with a smoothing coat of hydraulic-setting insulating cement.
- K. Insulate valves, strainer, fittings, and flanges with identical material, density, thickness, and surface finish as the piping insulation. All edges shall be filled with filler and finished with a smoothing coat of hydraulic-setting insulating cement.
- L. Insulate the entire surface of fittings and strainers. Insulate valves up to and including bonnets, unless authorized otherwise by Project Engineer. Do not cover removable valve bonnets.
- M. Insulate strainers to permit removal of the basket without disturbing the insulation of the strainer body. Strainer covers shall be molded and taped to upper section of insulation.
- N. Bevel the ends of pipe insulation adjacent to flanges to permit bolt removal. Provide a collar of sectional block insulation over the flanges and extend a minimum of 2 inches over the adjacent pipe insulation. Fasten with staples to permit easy removal. Prior to applying collar fill annular spaces with loose insulation.
- O. Insulate all piping through sleeves.
- P. Where pipelines pass through masonry walls or floors, completely fill the space between outside of pipe or insulation and the inside of the sleeve or framed opening with fibrous mineral wool or fiberglass pipe insulation.
- Q. When it is unavoidable and hangers for cold lines must be installed directly on the pipe, insulate and finish the entire hanger and the rod for a length of not less than 12 inches above the pipe.
- R. For hot lines supported on rollers, provide pipe covering protection saddles and fill the hollow interior of saddles with insulating cement or fibrous glass.
- S. Insulate Dresser-type couplings and other gasketed joints in refrigerant systems in a manner to allow removal of insulation, without damage, for repair and leak-checking of couplings and gasketed joints.
- T. Apply insulation to completely cover metal surfaces.

- U. Cut, score, or miter insulation to fit shape and contour of ductwork and equipment. Where surfaces are flat, cylindrical, or regularly curved, use premolded blocks or segments.
- V. Where required, provide permanently fastened angles or plates to support insulation.
- W. Apply insulation on cover plates, heads and access openings as separate sections, with insulation cut back for access to boltheads and other fasteners.
- X. Do not insulate over nameplates. Cut back insulation and line the insulation edges with 24 gage galvanized steel.
- Y. Surface Finish.
 - 1. Apply surface finish to present a tight, smooth appearance.
 - 2. Do not apply sealant or cement until all previous applications of cement and adhesives have thoroughly dried.
 - 3. Extend surface finish to protect all insulation surfaces. Prevent raw edges or ends of insulation from being exposed.

3.02 APPLICATION OF TYPE P1 INSULATION

- A. Exposed and Concealed Pipe: Staple longitudinal lap unless factory pre-sealed laps are supplied or adhesive is used, with 9/16 inch coated staples, 2 inches on center, butt adjoining sections firmly together. Apply butt-joint strips, making sure coated or dull side is out. Center the strip for a snug fit and fasten with 2 staples, one each approximately 1/2 inch from each edge.
- B. Exposed and Concealed Fittings, Valves, Flanges: Insulate with molded, pre-cut or segmental insulation equal in thickness to adjoining pipe insulation. Alternate: Hydraulic-setting insulating cement same thickness as adjoining insulation. Alternate: Pre-molded PVC fitting cover system.
- C. Surface Finish (Indoor)
 - 1. Exposed and Concealed Pipe: No additional finish required.
 - 2. Exposed and Concealed Fittings, Valves, Flanges: Apply a skim coat of insulating cement to produce a smooth surface. After cement is dry, apply a light coat of fitting mastic. While mastic is still wet, wrap the fitting with fiberglass reinforcing cloth strips overlapping the preceding layer by 1 to 2 inches and adjoining pipe by 2 inches, and embedding the cloth into the mastic. When dry, apply a second coat of mastic over the entire fitting to a minimum wet thickness of 3/64 inch. Alternate: Apply one piece pre-molded PVC fitting covers with galvanized coated tack fasteners.

Tape circumferential joint between insulation and premolded fitting cover with 2 inch pressure sensitive polyvinyl tape.
 Note: Wipe all joints clean before applying tape.
 Alternate: Apply 8 ounce canvas between 2 coats of lagging cement.

3.03 APPLICATION OF TYPE P2 INSULATION

- A. Exposed and Concealed Pipe: Seal lap of vapor barrier jacket with fire-resistant adhesive. Staple longitudinal lap with three 9/16 inch coated staples, applying lagging cement over staples. Adjoining sections of pipe insulation are to be butted tightly together and the vapor barrier continued by sealing the circumferential joint with butt joint strips adhered with fire-resistant adhesive.
- B. Exposed and Concealed Fittings, Valves, Flanges: Insulate with molded or segmental foamed glass insulation equal in thickness to adjoining pipe insulation and secured with No. 20 gage galvanized annealed steel wire.
- C. Surface Finish (Indoor)
 - 1. Exposed and Concealed Pipe: No additional finish required.

3.04 APPLICATION OF TYPE P3 INSULATION

- A. Slit insulation lengthwise. Coat longitudinal seams and joints with adhesive and install it on pipe. Miter insulation at elbows and glue.
- B. Fully cover seams and butt joints with adhesive to assure a complete seal to maintain insulation efficiency and vapor barrier.
- C. Do not stretch insulation to obtain longer lengths.
- D. Unless otherwise specified, completely insulate common applications (such as hose stations, drinking fountains, etc.) for chilled and hot water.
- E. On cold applications, insulate valves, unions, and pipe installed with direct contact clamp hangers, butt insulation to hanger both sides and install oversized materials over hanger. Lap 1 to 2 inches minimum onto the smaller sized material.
- F. On cold applications wrap all gages, petcocks, etc. with Cork Insulation Tape.

3.05 APPLICATION OF TYPE P5 INSULATION

- A. Provide a 1/2 inch to 3/4 inch safety edge on all exposed longitudinal seams (except corrugated aluminum jacketing).
- B. Longitudinal lap to be a minimum of 2 inches, located on horizontal centerline. Overlap butt joints a minimum of 3 inches.
- C. Install 1/2 inch wide stainless steel strips located on the edge of butt joint, and then on 12 inch centers thereafter. Use two strapping seals. The first to keep the strap tight and the second to cover and secure the cut end of the strap.
- D. Use aluminum butt straps where jacket cannot be overlapped (gored fittings and flanges). Use 1/2 inch wide stainless steel strips to hold butt straps.

- E. Seal seams, joints or openings in the jacket that cannot be sealed by overlapping the aluminum jacket or by butt straps with silicone rubber.
- F. Jacket both 45 degree and 90 degree elbows through 10 inches with preformed aluminum jackets. For fittings 12 inches and larger, use mitred fittings.
- G. Jacket other fittings or valves with sheet aluminum fabricated as necessary. Use aluminum jacketing only for end caps.
- H. Install "S" clips on vertical piping to hold jacket in place.
- I. Lap Directions, Horizontal Lines: Circumferential laps on exterior jacketing shall face east or south. Longitudinal laps shall face down (upper and lower) located on horizontal center line.
- J. Lap Directions, Vertical Lines: Interior or exterior jackets shall be overlapped shingle style (upper over lower). Exterior longitudinal laps shall face east or south.

3.06 APPLICATION OF TYPE P6 INSULATION

- A. GENERAL: Install hydrophobic pourable underground piping insulation in strict compliance with manufacturers installation guidelines and specifications. Provide and install all manufactures required forms, spacers, pipe supports, etc including polyfilm top vapor barrier and minimum 1'-6" backfill. (note: minimum depth of pipe to be 3'-0")

3.07 APPLICATION OF TYPE D4 INSULATION

- A. For round duct, fasten aluminum jacket in place with stainless steel strips. For rectangular duct, apply strips (corner beads) and sheet material secured with screws or pop rivets. Ducts greater than 24 inches shall have cross breaks.
- B. Jacketing sequence shall be bottom, sides, then top.
- C. Overlap seams a minimum of 2 inches.
- D. After bands are secure, use stainless steel or aluminum screws or pop-rivets on seams where necessary.
- E. Apply jacket shingle style on risers (upper jacket over lower) to provide drainage. Use stainless steel strip to secure jacketing.
- F. Seal breaks and seams in aluminum jacket with silicone rubber sealant.

3.08 SCHEDULE OF PIPING INSULATION

<u>Service</u>	<u>Size</u>	<u>Type</u>	<u>Thickness</u>
Heating Hot Water	Thru 1-1/4"	P1	1-1/2"
Heating Hot Water	1-1/2" & over	P1	2"
Steam	Thru 3"	P1	2-1/2"
Steam	4" & over	P1	3"
Steam condensate	Thru 1-1/4"	P1	1-1/2"
Steam condensate	1-1/2" & over	P1	2"
Air Handling Unit Drain			
Line (Condensate)	All	P1	1/2" (a)
Refrigerant (piping)	Thru 2"	P2	1"
Refrigerant (piping)	Over 2"	P2	2"
Pipe Supports (b)	All	P3	Varies (b)
Chilled Water	Thru 6"	P1	2" *

(*underground piping 'pourable' insulation minimum thickness=6"all around top/bottom/sides of pipe)

- a. All insulation thickness services shall be 1 inch thickness when applied outdoors-above ground. (Consider heating cables).
- b. Refer to D1.2.0, Insulation Protection at Pipe Support.

3.09 SCHEDULES OF DUCT INSULATION

<u>Insulation Service</u>	<u>Type</u>	<u>Thickness</u>
Concealed/Exposed Supply Ducts, etc (Refer to section 15290)	D2	2"

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15290 - DUCT INSULATION - INTERIOR

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

- A. This section includes duct and plenum insulation.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 15 Section "Ductwork" for duct lining.

1.03 DEFINITIONS

- A. Hot Surfaces: Normal operating temperatures of 100 deg F or higher.
- B. Dual-Temperature Surfaces: Normal Operating temperatures that vary from hot to cold.
- C. Cold Surfaces: Normal operating temperatures less than 75 deg F.
- D. Thermal Conductivity (k-value): Measure of heat flow through a material at a given temperature difference; conductivity is expressed in units of Btu x inch/h x sq. ft. x deg F.
- E. Density: Is expressed in lb/cu. ft.

1.04 SUBMITTALS

- A. General: Submit the following in accordance with General Conditions of the Contract and Division 1 specification sections.
- B. Product and data for each type of duct insulation identifying k-value, thickness, and accessories.
- C. Material certificates, signed by the manufacturer, certifying that materials comply with specified requirements where laboratory test reports cannot be obtained.
- D. Material test reports prepared by a qualified independent testing laboratory. Certify insulation meets specified requirements.

1.05 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 - 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

1.06 SEQUENCING AND SCHEDULING

- A. Schedule insulation application after testing of duct systems.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering 'GREENGUARD' certified products that may be incorporated in the Work include, but are not limited to the following:
 - 1. Glass Fiber:
 - a. CertainTeed Corporation.
 - b. Knauf Fiberglass GmbH.
 - c. Manville.

2.02 GLASS FIBER

- A. Material: Inorganic glass fibers, bonded with a thermosetting resin.
- B. Jacket: All-purpose, factory-applied, laminated glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil having self-sealing lap.
- C. Board: ASTM C 612, Class 2, semi-rigid jacketed board.
 - 1. Thermal Conductivity: 0.23 Btu x inch/h x sq. ft. x deg F average maximum at 75 deg F mean temperature.
 - 2. Density: 3 pcf average maximum.
- D. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets. (maximum 25% compression installed)
 - 1. Thermal Conductivity: 0.23 Btu x inch/h x sq. ft. x deg F average maximum at 75 deg F mean temperature.

- E. Adhesive: Produced under the UL Classification and follow-up service.
 - 1. Type: Non-flammable, water-based.
 - 2. Service Temperature Range: Minus 20 to 180 deg F (Minus 29 to 82 deg C).
- F. Vapor Barrier Coating: Waterproof coating recommended by insulation manufacturer for outside service.

2.03 ACCESSORIES AND ATTACHMENTS

- A. Glass Cloth and Tape: Woven glass fiber fabrics, plain weave, pre-sized a minimum of 8 ounces per sq. yd.
 - 1. Tape Width: 4 inches
 - 2. Cloth Standard: MIL-C-20079H, Type I.
 - 3. Tape Standard: MIL-C-20079H, Type II.
- B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:
 - 1. Stainless Steel: Type 304, 0.020 inch thick.
 - 2. Aluminum: 0.0070 inch thick.
- C. Wire: 14-gauge nickel copper alloy, 16-gauge, soft-annealed stainless steel, or 16-gauge, soft annealed galvanized steel.
- D. Corner Angles: 28-gauge (0.3 mm), 1 inch by 1 inch (25 mm by 25 mm) aluminum, adhered to 2 inches by 2 inches (51 mm by 51 mm) kraft paper.
- E. Anchor Pins: Capable of supporting 20 pounds each. Provide anchor pins and speed washers of sizes and diameters as recommended by the manufacturer for insulation type and thickness.

2.04 SEALING COMPOUNDS

- A. Vapor Barrier Compound: Water-based, fire-resistive composition.
 - 1. Water Vapor Permeance: 0.08 perm maximum.
 - 2. Temperature Range: Minus 20 to 180 deg F.
- B. Weatherproof Sealant: Flexible-elastomer-based, vapor-barrier sealant designed to seal metal joints.
 - 1. Water Vapor Permeance: 0.02 perm maximum.
 - 2. Temperature Range: Minus 50 to 250 deg F.
 - 3. Cooler: Aluminum.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Surface Preparation: Clean, dry and remove foreign materials such as rust, scale, and dirt.

3.02 INSTALLATION

- A. Refer to schedules at the end of this section for materials, forms, jackets, and thicknesses required for each duct system.
- B. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.
- C. Install vapor barriers on insulated ducts and plenums having surface operating temperatures below 60 deg.
- D. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.
- E. Install insulation with smooth, straight, and even surfaces.
- F. Seal joints and seams to maintain vapor barrier on insulation requiring a vapor barrier.
- G. Seal penetrations for hangers, supports, anchors, and other projections in insulation requiring a vapor barrier.
- H. Seal Ends: Except for flexible elastomeric insulation, taper ends at 45 degree angle and seal with lagging adhesive. Cut ends of flexible elastomeric cellular insulation square and seal with adhesive.
- I. Apply water based adhesives and coatings at the manufacturer's recommended coverage-per-gallon rate.
- J. Keep insulation materials dry during application and finishing.
- K. Install board insulation as follows:
 - 1. Adhesive and Band Attachment: Secure board insulation tight and smooth with at least 50 percent coverage of water based adhesive. Install bands spaced 12 inches apart. Protect insulation under bands and at exterior corners with metal corner angles. Fill joints, seams, and chipped edges with vapor barrier compound.
 - 2. Speed Washers Attachment: Secure insulation tight and smooth with speed washers and welded pins. Space anchor pins 18 inches apart each way and 3 inches from insulation joints. Apply vapor barrier coating compound to insulation in contact, open joints, breaks, punctures, and voids in insulation.
- L. Blanket Insulation: Install tight and smooth. Secure to ducts having long sides or diameters as follows:
 - 1. Smaller Than 24 Inches: Bonding water based adhesive applied in 6-inch (150-mm) wide transverse strips on 12-inch centers.

2. 24 inches and Larger: Anchor pins spaced 12 inches (300 mm) apart each way. Apply bonding adhesive to prevent sagging of the insulation.
3. Overlap joints 3 inches.
4. Seal joints, breaks, and punctures with vapor barrier compound.

3.03 JACKETS

- A. Foil and Paper Jackets (FP): Install jackets drawn tight. Install lap or butt strips at joints with material same as jacket. Secure with adhesive. Install jackets with 1-1/2 inches (40 mm) laps at longitudinal joints and 3 inches (75 mm) wide butt strips at end joints.
 1. Seal openings, punctures, and breaks in vapor barrier jackets, and exposed insulation with vapor barrier compound.

3.04 APPLICATIONS

- A. General: Materials and thicknesses are specified in schedules at the end of this Section.
- B. Duct Systems: Insulate all new interior ductwork.

3.05 DUCT SYSTEMS INSULATION SCHEDULE

- A. All interior supply and return ducts:

Material	Type	Installed R-value	Vapor Barrier Req'd	Field- Applied Jacket
Glass Fiber	Blanket	6.0	Yes	None

- B. All outdoor air intake ducts and outdoor air plenums:

Material	Type	Installed R-value	Vapor Barrier Req'd	Field- Applied Jacket
Glass Fiber	Blanket	8.0	Yes	None

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15510 - HOT/CHILLED WATER PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of hot and / or chilled water piping systems work is indicated on drawings and schedules, and by requirements of this section.
- B. Applications for hot/chilled water piping systems include the following:
 - 1. Hot/chilled water piping systems for hot/chilled water heating/cooling terminal units.
 - 2. Hot/chilled water piping systems for hot/chilled water coils in air handling units.
- C. Refer to appropriate Division 15 sections for insulation required in connection with hot/chilled water piping systems.

1.03 QUALITY ASSURANCE

- A. ANSI Compliance: Comply with applicable American National Standards pertaining to products and installation of hot/chilled water piping systems.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data for hot/chilled water piping systems, materials and products.
- B. Shop Drawings: Submit scaled layout drawings of installed hot/chilled water pipe and fittings including, but not necessarily limited to, pipe sizes, locations, elevations and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between piping and proximate equipment.

PART 2 - PRODUCTS

2.01 HOT/CHILLED WATER PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings and capacities as indicated. Where not indicated, provide proper

selection as determined by engineer to comply with installation requirements.

- B. Provide materials and products complying with ANSI B31.1 Code for Power Piping where applicable, base pressure rating on hot/chilled water piping systems maximum design pressures. Provide sizes and types matching piping and equipment materials used in hot/chilled water piping systems. Where more than one type of material or product is indicated, selection is engineer's option.

2.02 BASIC IDENTIFICATION

- A. General: Provide identification complying with Division 15 Basic Materials and Methods section "Mechanical Identification."

2.03 BASIC PIPE, TUBE AND FITTINGS

- A. General: Provide pipe, tube and fittings complying with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings," in accordance with the following listing:

- 1. Hot/chilled water AND low pressure steam piping:
 - a. Pipe size 2" and smaller: Black steel pipe.
 - 1) Pipe weight: Schedule 40.
 - 2) Fittings: Class 125 cast iron threaded.
 - b. Pipe size 2-1/2" and larger: Black steel pipe.
 - 1) Pipe weight: Schedule 40.
 - 2) Fittings: Wrought steel butt welding.

2.04 BASIC PIPING SPECIALTIES

- A. General: Provide piping specialties complying with Division 15 Basic Materials and Methods section "Piping Specialties."

2.05 BASIC SUPPORTS, ANCHORS AND SEALS

- A. General: Provide supports, anchors and seals complying with Division 15 Basic Material and Methods section "Supports, Anchors, and Seals." Supports and anchors provided shall meet the requirements of section 1613 of the New York State Building Code; horizontal and vertical runs of pipe shall be securely supported in accordance with the New York State Building Code including seismic requirements

2.06 BASIC VALVES

- A. General: Provide valves complying with Division 15 Basic Materials and Methods section "Valves," in accordance with the following listings:

- 1. Sectional Valves:
 - a. 2" and smaller: Ball valves (hot/chilled water only).

- b. 2-1/2" and larger: rising stem or O.S.&Y. type.
- c. 2-1/2" and larger: Butterfly valves (when specifically approved by the engineer only).

2. Shutoff Valves:

- a. 2" and smaller: Ball valves (hot/chilled water only)
- b. 2-1/2" and larger: Rising stem or O.S.&Y. valves. Butterfly valves may be used only after specific approval by the engineer.

3. Heating/Cooling Terminal Outlet Valves:

- a. 2" and smaller: Balance valve (hot/chilled water only)
- b. 2-1/2" and larger: Rising Stem.

4. Drain Valves:

- a. 2" and smaller: Ball valves.

5. Check Valves:

- a. All sizes: Silent wafer type check valve.

2.07 BASIC EXPANSION COMPENSATION

A. General: Provide expansion compensation products complying with Division 15 Basic Materials and Methods section "Expansion Compensation," in accordance with the following listing:

- 1. Flexible ball pipe joints (hot/chilled water only) Use fabricated piping loops for low pressure steam or linear bellows type rated for steam service.
- 2. Pipe alignment guides and anchors.

2.08 BASIC THERMOMETERS AND GAUGES

A. General: Provide meters and gauges complying with Division 15 Basic Materials and Methods section "Thermometers and Gauges," in accordance with the following listing:

- 1. Temperature gauges and fittings.
- 2. Pressure gauges and fittings.
- 3. Flow measuring gauges.

2.09 HYDRONIC SPECIALTIES

A. General: Provide hydronic specialties complying with Division 15 section "Hydronic Specialties," in accordance with the following listing:

- 1. Balance valves.
- 2. Balance cocks.
- 3. Vent valves.
- 4. Flow control valves.
- 5. Diverting fittings.

6. Air separators.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

- A. General: Install mechanical identification in accordance with Division 15 Basic Materials and Methods section "Mechanical Identification."

3.02 INSTALLATION OF HOT/CHILLED WATER WATER DISTRIBUTION PIPING

- A. General: Install water distribution piping in accordance with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings."
- B. Install eccentric reducers where pipe is reduced in size in direction of flow, with tops of both pipes and reducer flush.
- C. Install piping with 1" minimum rise in 40' pipe run (0.2%) in direction of flow.
- D. Install piping level with no pitch.
- E. Connect branch feed piping to mains at horizontal center line of mains, connect run-out piping to branches at horizontal center line of branches.
- F. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

3.03 INSTALLATION OF PIPING SPECIALTIES

- A. Install piping specialties in accordance with Division 15 Basic Materials and Methods section "Piping Specialties."

3.04 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

- A. Install supports, anchors and seals in accordance with Division 15 Basic Materials and Methods section "Supports, Anchors and Seals", and project drawings and details.

3.05 INSTALLATION OF VALVES

- A. Install valves in accordance with Division 15 Basic Materials and Methods section "Valves."
- B. Sectional valves: Install on each branch and riser, close to main, where branch or riser serves two or more heating terminals or equipment connections and elsewhere as indicated.
- C. Shutoff valves: Install on inlet and outlet of each mechanical equipment item and on inlet of each heating/cooling terminal and elsewhere as indicated.

- D. Heating/cooling terminal outlet valves: Install on outlet of each heating/cooling terminal and elsewhere as indicated.
- E. Drain valves: Install on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system and elsewhere where indicated or required to completely drain hot/chilled water piping system.
- F. Check valves: Install on discharge side of each pump and elsewhere as indicated.

3.06 INSTALLATION OF EXPANSION COMPENSATION PRODUCTS

- A. Install expansion compensation products in accordance with Division 15 Basic Materials and Methods section "Expansion Compensation."

3.07 INSTALLATION OF THERMOMETERS AND GAUGES

- A. Install thermometers and gauges in accordance with Division 15 Basic Materials and Methods section "Thermometers and Gauges."

3.08 INSTALLATION OF HYDRONIC SPECIALTIES

- A. General: Install hydronic specialties in accordance with Division 15 "Hydronic Specialties" section.

3.09 EQUIPMENT CONNECTIONS

- A. General: Connect hot/chilled water piping system to mechanical equipment as indicated and comply with equipment manufacturer's instructions where not otherwise indicated. Install shutoff valve and union on supply and return, drain valve on drain connection.
- B. Hot/chilled water terminals: Install hot/chilled water terminals with heating/cooling terminal outlet valve and union on outlet, union, shutoff valve on inlet. Install automatic air vent valve on element in accordance with manufacturer's instructions. Locate valves and balancing cocks behind valve access doors for ease of maintenance. Where indicated, install automatic temperature control valve with unions between all ports of the control valve.

3.10 CLEANING, FLUSHING AND INSPECTING

- A. General: Include coils, etc. See Division 15 "Pipe Tube and Fittings".

3.11 TESTING AND BALANCING

- A. General: See Division 15 "Testing, Adjusting and Balancing."

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15511 - FIRE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested fire stop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of ductwork, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- B. Safing slot gaps between edge of floor slabs and curtain walls.
- C. Openings between structurally separate sections of wall or floors.
- D. Gaps between the top of walls and ceilings or roof assemblies.
- E. Expansion joints in walls and floors.
- F. Openings and penetrations in fire-rated partitions or walls containing fire doors.
- G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03300 - Cast-In-Place Concrete Work
 - 2. Section 07900 - Caulking
 - 3. Section 04200 - Unit Masonry
 - 4. Section 09200 - Lath and Plaster
 - 5. Section 09250 - Gypsum Wall Board
 - 6. Section 15050 - Basic Materials and Methods
 - 7. Section 15250 - Mechanical Insulation

1.05 REFERENCES

- A. Test Requirements: ASTM E-814-02, "Standard Method of Fire Tests of Through Penetration Fire Stops"
- B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 - 1. UL Fire Resistance Directory:
 - a. Fire stop Devices (XHJI)
 - b. Fire Resistance Ratings (BXUV)
 - c. Through-Penetration Fire stop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
 - 2. Alternate "Omega Point Laboratories Directory" (updated annually)
- C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems" (July 1998.)
- D. Test Requirements: ASTM E 1966-01, "Standard test method for Fire Resistive Joint Systems"
- E. Inspection Requirements: ASTM E 2174 - 01, "Standard Practice for On-site Inspection of Installed Fire Stops."
- F. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- G. ASTM E-84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.
- H. All major building codes: ICBO, SBCCI, BOCA, and IBC.
- I. NFPA 101 - Life Safety Code
- J. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- B. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.
- B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.

- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - 1. Hilti, Inc., Tulsa, Oklahoma (or equal)
800-879-8000

2.03 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are

acceptable:

1. Hilti CP 680 Cast-In Place Firestop Device
 - a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
 2. Hilti CP 681 Tub Box Kit for use with tub installations.
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
 2. Hilti CP 604 Self-leveling Firestop Sealant
 3. Hilti CP 620 Fire Foam
 4. Hilti CP 606 Flexible Firestop Sealant
 5. Hilti CP 601s Elastomeric Firestop Sealant
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
1. Hilti CP 601s Elastomeric Firestop Sealant
 2. Hilti CP 606 Flexible Firestop Sealant
 3. Hilti FS-ONE Intumescent Firestop Sealant
- E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
1. Hilti CP 672 Speed Spray
 2. Hilti CP 601s Elastomeric Firestop Sealant
 3. Hilti CP 606 Flexible Firestop Sealant
 4. Hilti CP 604 Self-leveling Firestop Sealant
- F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
1. Hilti CP 677 Speed Plugs
 2. Hilti CP 767 Speed Strips
- G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
- H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti FS-ONE Intumescent Fire stop Sealant
 2. Hilti CP 618 Fire stop Putty Stick
 3. Hilti CP 620 Fire Foam
 4. Hilti CP 601s Elastomeric Fire stop Sealant

- 5. Hilti CP 606 Flexible Fire stop Sealant
- I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - 1. Hilti CP 618 Fire stop Putty Stick
- J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - 1. Hilti CP 617 Fire stop Putty Pad
- K. Fire stop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - 1. Hilti CP 642 Fire stop Collar
 - 2. Hilti CP 643 Fire stop Collar
 - 3. Hilti CP 645 Wrap Strips
- L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
 - 1. Hilti CP 637 Trowelable Fire stop Compound
 - 2. Hilti FS 657 FIRE BLOCK
 - 3. Hilti CP 620 Fire Foam
- M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
 - 1. Hilti FS 657 FIRE BLOCK
- N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
 - 1. Hilti CP 672 Speed Spray
 - 2. Hilti CP 601s Elastomeric Fire stop Sealant
 - 3. Hilti CP 606 Flexible Fire stop Sealant
 - 4. Hilti CP 604 Self-Leveling Fire stop Sealant
- O. Provide a fire stop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
- P. Provide a fire stop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which fire stop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

- A. Coordinate location and proper selection of cast-in-place Fire stop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place fire stop devices without interferences.

3.03 INSTALLATION

- A. Regulatory Requirements: Install fire stop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
 - 2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL fire stop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - 3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing fire stop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess fire stop materials and soiling as work progresses.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15515 - HYDRONIC SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of hydronic specialties required by this section is indicated on drawings, and/or specified in other Division 15 hydronic piping system sections.
- B. Types of hydronic specialties specified in this section include the following:
 - 1. Balance valves.
 - 2. Vent valves.
 - 3. Flow control valves.
 - 4. Diverting fittings.
 - 5. Air separators.
 - 6. Compression tanks.
 - 7. Pump discharge valves.
 - 8. Shot feeders.
 - 9. Water relief valves.
 - 10. Pressure reducing valves.
 - 11. RPZ - Backflow Preventer

1.03 QUALITY ASSURANCE

- A. Materials and equipment shall be provided by one of the manufacturers listed in Part 2 - Products. Materials and equipment from other manufacturers may be accepted if proven equal to those specified. This contractor is liable for and shall pay for all architectural and engineering review and redesign costs for substitute materials and equipment. This contractor also is liable for all costs of changes in the work required by substitute equipment.
- B. The length of time the manufacturer has been in business, the location and capability of complete repair facilities, availability of repair parts and annual maintenance contracts all will be considered in determining equality. Refer to requirements pertaining to substitute materials and equipment.

1.04 SUBMITTALS

- A. Product data - submit catalog cuts, specifications, installation instructions and dimensioned drawings for each type of manufactured hydronic specialty. Include pressure drop curve or chart for each type and size of hydronic specialty.

- B. Shop drawings - submit for fabricated specialties, indicating details of fabrication, materials and method of support.
- C. Maintenance data - submit maintenance data and spare parts lists for each type of manufactured hydronic specialty. Include this data in maintenance manual.
- D. Hydronic specialty types - provide hydronic specialties of same type by same manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURED HYDRONIC SPECIALTIES

- A. General - provide factory fabricated hydronic specialties recommended by manufacturer for use in service indicated. Provide hydronic specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by the engineer to comply with installation requirements. Provide sizes as indicated and connections which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is the engineers' option, but more than one type cannot be used on project.
- B. Balance valves:
 - 1. General - provide balance valves as indicated, of one of the following types:
 - a. Threaded ends 2" and smaller - Class 125, bronze body, ball valve with memory stop.
 - b. Soldered ends 2" and smaller - Class 125, bronze body, ball valve with memory stop.
 - c. Threaded, soldered, of flanged end globe style providing three (3) functions:
 - 1) Precise flow measurement
 - 2) Precision flow balancing
 - 3) Positive shut-off, no drip seat, teflon disk, 1-1/2" to 2" size - drain connection with protective cap.
Vernier-type setting with "hidden memory" feature to program valve for tamper-proof setting. Balance meter, valved connections.
Manufacturer: Armstrong Pumps, Type CBV.
- C. Vent valves:
 - 1. Manual vent valves - provide manual vent valves designed to be operated manually with screwdriver or thumbscrew, 1/8" N.P.T. connection.
 - 2. Automatic vent valves - provide automatic vent valves designed to vent automatically with float principle, stainless steel float and mechanisms, cast iron body,

pressure rated for 125 psi, 1/2" N.P.T. inlet and outlet connections.

3. Manufacturer - subject to compliance with requirements, provide vent valves of one of the following:

- a. Bell & Gossett, ITT Fluid Handling Div.
- b. Taco, Inc.
- c. Armstrong Co.

D. Flow control valves:

1. General - provide flow control valves pressure rated for 125 psi, containing lift check assembly which will automatically open by means of pump flow pressure, and automatically close when pump is not operating. Provide with means to manually open in case of pump failure.

- a. Threaded ends 2" and smaller - cast iron body, bronze check mechanism, screw-in bonnet, straight or angle pattern.
- b. Soldered ends 1 1/4" and smaller - cast bronze body, bronze check mechanism, screw in bonnet, straight or angle pattern.
- c. Threaded ends 2 1/2" through 4" - cast iron body, bronze check mechanism, screw in bonnet, straight or angle pattern.

2. Manufacturer - subject to compliance with requirements, provide flow control valves of one of the following:

- a. Bell & Gossett, ITT Fluid Handling Div.
- b. Taco, Inc.
- c. Armstrong Pump Co.

E. Diverting fittings:

1. General - provide diverting fittings as indicated for one pipe hydronic piping systems. Construct fittings of cast iron with threaded ends or wrought copper with solder ends, pressure rated for 125 psi. Provide indication on fitting of direction of flow for supply or return applications. Furnish flow and pressure drop curves based on manufacturer's testing with submittal.

2. Manufacturer - subject to compliance with requirements, provide diverting fittings of one of the following:

- a. Armstrong Pumps, Inc.
- b. Bell & Gossett, ITT Fluid Handling Div.

F. Air Separators:

1. General - provide air separators pressure rated for 125 psi. Select capacity based on total system gpm.
2. Dip tube fittings - provide dip tube fittings in boilers as

indicated to prevent free air collected in boiler from rising into system.

3. In-Line air separators - provide in-line air separators as indicated. Construct sizes 1 1/2" and smaller of cast iron, and sizes 2" and larger of steel complying with ASME Boiler and Pressure Vessel Code and stamped with "U" symbol. Furnish National board Form U-1 denoting compliance.
4. Combination separator/strainer - provide external combination air separators/strainers as indicated. Construct of steel complying with ASME Boiler and Pressure Vessel Code and stamped with "U" symbol. Furnish National Board Form U-1 denoting compliance. Provide galvanized steel integral strainer with 3/16" preforations and free area of not less than 5 times cross sectional area of connecting lines. Provide tangential inlet and outlet connections and internal stainless steel air collector tube designed to direct released air into compression tank. Provide blowdown connections.
5. Manufacturer - subject to compliance with requirements, provide air separators of one of the following:
 - a. Armstrong Pumps, Inc.
 - b. Bell & Gossett, ITT Fluid Handling Div.
 - c. Taco, Inc.

G. Compression tank:

1. General - provide compression tanks of size and number as indicated. Construct of steel for 125 psi pressure rating complying with ASME Boiler and pressure Vessel Code and stamped with "U" symbol. Furnish National Board Form U-1 denoting compliance. Provide tapings in bottom of tank for tank fitting.
 - a. Tank fittings - provide tank fittings for compression tanks as indicated, sized for compression tank diameter. Design tank fittings for 125 psi pressure rating and include manual vent to establish proper air volume in tank on initial fill.
2. Manufacturer - subject to compliance with requirements, provide compression tanks and tank fittings of one of the following:
 - a. Armstrong Pumps, Inc.
 - b. Bell & Gossett, ITT Fluid Handling Div.
 - c. Taco, Inc.

H. Diaphragm type compression tanks:

1. General - provide diaphragm compression tanks of size and number as indicated. Construct tank of welded steel, constructed, tested and stamped in accordance with Section VII of the ASME Boiler and Pressure Vessel Code for a working pressure of 125 psi. Furnish National Board Form U-1 denoting compliance. Support vertical tanks with steel legs or base, support horizontal tanks with steel saddles. Provide specially compounded flexible diaphragm securely sealed into tank to permanently separate air charge from system water, to maintain design expansion capacity. Provide pressure gauge and air charging fitting.
2. Manufacturer - subject to compliance with requirements, provide diaphragm type compression tanks of the following:
 - a. Bell & Gossett, ITT Fluid Handling Div.
 - b. Armstrong Pumps, Inc.

I. Pump discharge valves:

1. General - provide pump discharge valves as indicated. Provide Non-slam check valve with spring loaded disc and calibrated adjustment feature permitting regulation of pump discharge flow and shutoff. Provide flanged cast iron valve body, pressure rated for 175 psi, maximum operating temperature of 300 degrees F. Provide straight or angle pattern as required.
2. Manufacturer - subject to compliance with requirements, provide Pump discharge valves of one of the following:
 - a. Armstrong Pumps, Inc.
 - b. Bell & Gossett, ITT Fluid Handling Div.

J. Shot feeders:

1. General - provide shot feeders of 5 gallon capacity or otherwise as indicated, constructed of cast iron or steel, for introducing chemicals in hydronic system. Provide funnel and valve on top for loading drain valve in bottom, and recirculating valves on side. Construct for pressure rating of 125 psi.
2. Manufacturer - subject to compliance with requirements, provide shot feeders of one of the following:
 - a. Culligan USA
 - b. Laboratories, Subsidiary of Clow Corp.
 - c. Mougul Div., The Dexter Corp.

K. Water relief valves:

1. General - provide water relief valves as indicated, of size and capacity as selected by Installer for proper relieving capacity, in accordance with ASME Boiler and Pressure Vessel Code.
 - a. Combined pressure temperature relief valves - bronze body, test lever, thermostat, complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 degrees F (99 C) and pressure relief as indicated on drawing.
 - b. Pressure relief valves - bronze body, test lever, ASME rated. Provide pressure relief at as indicated on drawing.
2. Manufacturer - subject to compliance with requirements, provide water relief valves of one of the following:

L. Pressure Reducing Valves:

1. General - provide pressure reducing valves as indicated, of size and capacity as selected by Installer to maintain operating pressure on boiler system.
2. Construction - brass body, low inlet pressure check valve, inlet strainer removable without system shutdown, non-corrosive valve seat and stem, factory set at operating pressure.
3. Manufacturer - subject to compliance with requirements, provide pressure reducing valves of one of the following:
 - a. Bell & Gossett, ITT Fluid Handling Div.
 - b. Taco, Inc.
 - c. Armstrong Pumps, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Balance valves:

1. General - Install on each hydronic terminal and elsewhere as indicated.

B. Vent valves:

1. Manual vent valves - install manual vent valves on each hydronic terminal at highest point, and on each hydronic piping drop in direction of low for mains, branches and runouts and elsewhere as indicated.

2. Automatic vent valves - install automatic vent valves at top of each hydronic riser and elsewhere as indicated. Install shutoff valve between riser and vent valve, pipe outlet to suitable plumbing drain, or as indicated.
- C. Flow control valves:
1. General - install flow control valves on discharge of each pump serving a hot water heating system or zone and elsewhere as indicated. Install in upright position in a horizontal line with adequate clearance for service and replacement. Adjust flow sensitivity for automatic operation.
- D. Diverting fittings:
1. General - install diverting fittings as indicated and in accordance with manufacturer's instructions. Position fittings on supply and return mains with proper orientation for flow.
- E. Air separators:
1. Dip tube fittings - install dip tube fittings in boiler outlet in accordance with manufacturer's instructions. Run piping to compression tank pitched towards tank at 1" rise in 5' runs (1.7%).
 2. In-Line air separators - install in-line air separators in pump suction lines. Connect inlet and outlet piping. Run piping to compression tank pitched towards tank at 1" rise in 5' run (1.7%). Install drain valve on units 2" and over.
 3. Combination separator/strainer - install external combination separators/strainers in pump suction lines. Connect inlet and outlet piping. Run piping to compression tank pitched towards tank at 1" rise in 5' run (1.7%). Install blowdown valve and piping. Remove and clean strainer after 24 hours and again after 30 days of system operation.
- F. Compression tanks:
1. General - install compression tanks on trapeze hangers sized for tank fully loaded, or otherwise as indicated. Install tank fitting and drain valve in tank bottom and charge tank in accordance with manufacturer's instructions.
- G. Diaphragm type compression tanks:
1. General - install diaphragm type compression tanks on floor as indicated, in accordance with manufactureer's instructions. Vent and purge air from hydronic system, charge tank with proper air charge as recommended by manufacturer.

H. Pump discharge valves:

1. General - at engineers option, install pump discharge valves on each pump discharge line in lieu of separate shutoff valve, check valve, and balance cock. Install in horizontal or vertical position with stem in upward position, allow clearance above stem for check mechanism removal. After hydronic system has been completed, mark calibrated name plate with stripe of yellow lacquer to permanently mark final balanced position.

I. Shot feeders:

1. General - install shot feeders on each hydronic system at pump discharge and elsewhere as indicated. Install in upright position with top of funnel not more than 48" above floor. Install in pump discharge line as indicated.

J. Water relief valves:

1. General - Install on hot water generators and elsewhere as indicated. Pipe discharge to floor. Comply with ASME Boiler and Pressure Vessel Code. Cut discharge pipe at 45° angle.

K. Pressure reducing valves:

1. Install for each hot water boiler or heat exchanger as indicated, and in accordance with manufacturer's installation instructions.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15530 - REFRIGERATION PIPING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of refrigeration piping systems work is indicated on drawings and schedules, and by requirements of this section.
- B. Applications for refrigeration piping systems include the following:
 - 1. Refrigerant suction line piping between compressors and cooling coils.
 - 2. Refrigerant liquid line piping between liquid receivers and cooling coils.
 - 3. Refrigerant discharge line piping between compressors and condensers.
 - 4. Refrigerant condenser drain line piping between condensers and liquid receivers.
- C. Insulation for refrigeration piping is specified in applicable Division 15 sections, and is included as work of this section.
- D. Refer to appropriate Division 15 sections for insulation required in connection with refrigeration piping, not work of this section.

1.03 QUALITY ASSURANCE

- A. Materials and equipment shall be provided by one of the manufacturers listed in Part 2 - Products. Materials and equipment from other manufacturers may be accepted if proven equal to those specified. This contractor is liable for and shall pay for all architectural and engineering review and redesign costs for substitute materials and equipment. This contractor also is liable for all costs of changes in the work required by substitute equipment.
- B. The length of time the manufacturer has been in business, the location and capability of complete repair facilities, availability of repair parts and annual maintenance contracts all will be considered in determining equality.
- C. Refer to General Conditions Section GC31, "Submissions", for requirements pertaining to substitute materials and equipment.

- D. Installer - a firm with at least 3 years of successful installation experience on projects with refrigeration piping system work similar to that required for project.
- E. ANSI code compliance - comply with applicable provisions of ANSI B31.5, "Refrigeration Piping" and extend applicable lower pressure limits to pressures below 15 psig.
- F. Safety code compliance - comply with applicable portions of ANSI/ASHRAE 15, "Safety Code for Mechanical Refrigeration".
- G. Brazing - comply with applicable requirements of ANSI B31.5, "Refrigeration Piping", pertaining to brazing of refrigeration piping for shop and project site locations.

1.04 SUBMITTALS

- A. Product data - submit manufacturer's data for refrigeration piping systems materials and products.
- B. Brazing certification - certify brazing procedures, brazers and operators in accordance with ASME standards (ANSI B31.5).
- C. Shop drawings - submit scaled layout drawings of installed refrigeration pipe and fittings including, but not necessarily limited to, pipe sizes, locations, elevations and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between piping and proximate equipment.

PART 2 - PRODUCTS

2.01 REFRIGERATION PIPING MATERIALS AND PRODUCTS

- A. General - provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by engineer and manufacturer of equipment to comply with installation requirements. Provide materials and products complying with ANSI B31.5 Code for Refrigeration Piping where applicable, base pressure rating of refrigeration piping system maximum design pressures. Provide sizes and types matching piping and equipment connections, provide fittings of materials which match pipe materials used in refrigeration piping systems. Where more than one type of materials or products are indicated, selection is engineers' option.

2.02 BASIC IDENTIFICATION

- A. General - provide identification complying with Division 15 Basic Materials and Methods section in accordance with the following listing:
 - 1. Refrigeration piping - plastic pipe markers.

2.03 BASIC PIPE, TUBE AND FITTINGS

- A. General - provide pipe, tube and fittings complying with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings", in accordance with the following listing:
1. Pipe size 2" and smaller - black steel pipe.
 - a. Pipe weight - Schedule 40.
 - b. Pipe weight - Schedule 80.
 - c. Fittings - forged steel, socket welding.
 - d. Fittings - wrought steel, butt welding.
 2. Pipe size 2 1/2" and larger - black steel pipe.
 - a. Pipe weight - Schedule 40
 - b. Pipe weight - Schedule 80.
 - c. Fittings - wrought steel, butt welding.
 3. Tube size 3" and smaller - copper tube.
 - a. Wall thickness - Type K, hard drawn temper.
 - b. Wall thickness - Type L, hard drawn temper.
 - c. Fittings - wrought copper, solder joints.
 - d. Joints - soldered, silver lead solder, ANSI/ASTM B 32, Grade 96 TS.
 - e. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.
 4. Tube size 4 1/8" and smaller - copper tube.
 - a. Wall thickness - type ACR, hard drawn temper.
 - b. Fittings - wrought copper, solder joints.
 - c. Joints - soldered, silver lead solder, ANSI/ASTM B 32, Grade 96 TS.
 - d. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.
 5. Tube size 3/4" and smaller - copper tube.
 - a. Wall thickness - type ACR, soft annealed temper.
 - b. Fittings - cast copper alloy for flared copper tubes.
 - c. Joints - flared.
 6. Tube size 7/8" through 4 1/8" - copper tube.
 - a. Wall thickness - type ACR, soft annealed temper.
 - b. Fittings - wrought copper, solder joints.
 - c. Joints - soldered, silver solder, ANSI/ASTM B 32, Grade 96 TS.
 - d. Joints - brazed, American Welding Society (AWS) classification BCuP-4 for brazing filler metal.

2.04 BASIC PIPING SPECIALTIES

- A. General - provide piping specialties complying with Division 15 Basic Materials and Methods section "Piping Specialties", in accordance with the following listing:
 - 1. Pipe escutcheons.
 - 2. Pipe sleeves.

2.05 BASIC SUPPORTS, ANCHORS AND SEALS

- A. General - provide supports, anchors and seals complying with Division 15 Basic Materials and Methods section "Supports, Anchors and Seals", in accordance with the following listing:
 - 1. Adjustable steel clevises, adjustable roller hangers, and adjustable pipe roll stands for horizontal piping hangers and supports.
 - 2. Two bolt riser clamps for vertical piping supports.
 - 3. Concrete inserts, C-clamps, and steel brackets for building attachments.
 - 4. Protection shields for insulated piping support in hangers.
 - 5. Copper flashings for piping penetrations.

2.06 SPECIAL REFRIGERATION VALVES

- A. General - special valves required for refrigeration piping systems include the following types:
 - 1. Globe and check valves:
 - a. Globe shutoff valves - forged brass, packed, back seating, winged seal cap, 300 degrees F (149 C) temperature rating, 500 psi working pressure.
 - b. Check valves - forged brass, accessible internal parts, soft synthetic seat, fully guided brass piston and stainless steel spring, 250 degrees F (121 C) temperature rating, 500 psi working pressure.
 - c. Available manufacturers - subject to compliance with requirements, manufacturers offering globe and check valves which may be incorporated in the work include, but are not limited to, the following:
 - d. Manufacturer - one of the following:
 - 1) Henry Valve Co.
 - 2) Parker Hannifin Corp, Refrigeration & Air Conditioning Div.
 - 3) Sporlan Valve Co.

2. Solenoid valves:

- a. 2-way solenoid valves - forged brass, designed to conform to ARI 760, normally closed, teflon valve seat, NEMA 1 solenoid enclosure, 24 volt, 60 Hz., UL listed, 1/2" conduit adapter, 250 degrees F (121 C) temperature rating, 400 psi working pressure.
 - 1) Manual operator - provide manual operator to open valve.
- b. Available manufacturers - subject to compliance with requirements, manufacturers offering solenoid valves which may be incorporated in the work include, but are not limited to, the following:
- c. Manufacturer - one of the following:
 - 1) Alco Controls Div. Emerson Electric Co.
 - 2) Automatic Switch Co.
 - 3) Sporland Valve Co.

2.07 REFRIGERATION ACCESSORIES

- A. Refrigerant strainers - brass shell and end connections, brazed joints, monel screen, 100 mesh, UL listed, 350 psi working pressure.
- B. Moisture liquid indicators - forged brass, single port, removable cap, polished optical glass, solder connections, UL listed, 200 degrees F (93 C) temperature rating, 500 psi working pressure.
- C. Refrigerant filter driers - steel shell, ceramic fired desiccant core, solder connections, UL listed, 500 psi working pressure.
- D. Refrigerant filter driers - corrosion resistant steel shell, steel flange ring and spring, wrought copper fittings, ductile iron cover plate with steel cap screws, replaceable filter drier core, 500 psi working pressure.
- E. Evaporator pressure regulators - provide corrosion resistant, spring loaded, stainless steel springs, pressure operated, evaporator pressure regulator, in size and working pressure indicated, with copper connections.
- F. Refrigerant discharge line mufflers - provide discharge line mufflers as recommended by equipment manufacturer for use in service indicated, UL listed.
- G. Available manufacturers - subject to compliance with requirements, manufacturers offering refrigeration accessories which may be incorporated in the work include, but are not limited to, the following:
- H. Manufacturer - one of the following:

1. Alco Controls Div. Emerson Electric Co.
2. Henry Valve Co.
3. Sporlan Valve Co.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

- A. General -install mechanical identification in accordance with Division 15 Basic Materials and Methods section "Mechanical Identification"

3.02 INSTALLATION OF REFRIGERATION PIPING

- A. General - install refrigeration piping in accordance with Division 15 Basic Materials and Methods section "Pipe, Tube and Fittings", and in compliance with equipment manufacturer's recommendations.

3.03 INSTALLATION OF PIPING SPECIALTIES

- A. Install piping specialties in accordance with requirements of Division 15 Basic Materials and Methods section "Piping Specialties".

3.04 INSTALLATION OF SUPPORTS, ANCHORS AND SEALS

- A. Install supports, anchors, and seals in accordance with requirements of Division 15 Basic Materials and Methods section "Supports, Anchors and Seals".

3.05 INSTALLATION OF SPECIAL REFRIGERATION VALVES

- A. General - install refrigeration valves where indicated, and in accordance with manufacturer's instructions. Remove accessible internal parts before soldering or brazing, replace after joints are completed.
 1. Solenoid valves - install in refrigerant piping as indicated with stem pointing upwards.
 - a. Wiring of solenoid valves is specified in applicable Division 16 sections and is included as work of this section.
 - b. Wiring of solenoid valves is specified in applicable Division 16 sections, not work of this section.

3.06 INSTALLATION OF REFRIGERATION ACCESSORIES

- A. Refrigerant strainers - install in refrigerant lines as indicated and in accessible location for service.
- B. Moisture liquid indicators - install as indicated on refrigerant liquid lines, in accessible location.

- C. Refrigerant filter dryers - install in refrigerant lines as indicated, and in accessible location for service.
- D. Evaporator pressure regulators - install in refrigerant suction lines or evaporator outlets as indicated. Adjust, if required, for proper evaporator pressure.
- E. Refrigerant discharge line mufflers - install as indicated, in horizontal or downflow portion of hot-gas lines, immediately after leaving compressor, not in riser.

3.07 EQUIPMENT CONNECTIONS

- A. General - connect refrigerant piping to mechanical equipment in manner shown, and comply with equipment manufacturer's instructions where not otherwise indicated.

3.08 FIELD QUALITY CONTROL

- A. Refrigerant piping leak test - prior to initial operation, clean and test refrigerant piping in accordance with ANSI B31.5, "Refrigeration Piping". Perform initial test with dry nitrogen, using soap solution to test all joints. Perform final test with 27" vacuum and then 200 psi using halide torch. System must be entirely leak free.
- B. Repair or replace refrigerant piping as required to eliminate leaks and retest as specified to demonstrate compliance.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15545 - VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Variable frequency drives indicated by Drawings and Schedules.
- B. Variable frequency drive reactors or isolation transformers.

1.02 SUBMITTALS

- A. Submit manufacturer's data on variable frequency drives and motors.
- B. Shop drawings of AFC, reactors, and wiring diagrams shall be provided with list of parts including fuses and breakers.
- C. Maintenance Data - submit maintenance data and spare parts list for variable frequency drives and motors. Include this data in Maintenance Data.

1.03 QUALITY ASSURANCE

- A. Comply with NEC as applicable to wiring methods, construction and installation of variable frequency drives and motors.
- B. Comply with applicable requirements of UL 508, "Electrical Industrial Control Equipment", pertaining to variable frequency drives. Provide variable frequency drives and motors which have been UL listed and labeled.
- C. Comply with applicable portions of NEMA Standards pertaining to motor controllers/starters and enclosures.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store variable frequency drives in clean dry place prior to installation. Protect from weather, dirt, fumes, water and physical damage etc.
- B. Protect after installation similarly. Do not install until location is enclosed and weathertight.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Provide products of one of the following:
 - 1. Reliance Electric VTAC V
 - 2. Toshiba
 - 3. Mitsubishi Electric

B. General

1. Provide AFC suitable to serve as starter and a disconnect to the motor.
2. The adjustable frequency controller (AFC) together with all options and modifications shall mount within standard NEMA 1 enclosure suitable for continuous operation with a maximum ambient of 40 degrees C.
3. All high voltage component within enclosure shall be isolated with steel covers.
4. The complete unit shall be UL approved and labeled as an assembly.
5. The AFC shall not emit any measurable electro magnetic interference at a distance of 3 feet from unit.
6. Convert 60 Hz line frequency and voltage to stepless motor control from 10 percent to 110 percent of base speed.

C. Electrical Characteristics

1. DV/Dt and Di/Dt protection for semiconductors.
2. Capable of starting into a rotating load without delay.
3. Protective circuits shall cause instantaneous trip (IET) should any of the following faults occur:
 - a. 110% of controller maximum sine wave current rating is exceeded.
 - b. Output phase to phase short circuit condition.
 - c. Low input line voltage.
 - d. Loss of input line voltage.
 - e. Loss of input phase.
 - f. External fault. This protective circuit shall permit, by means of terminal strip, wiring of remote NC safety contacts such as high static, firestat, etc., to shut down the drive.
4. The following adjustments shall be available in the controller:
 - a. Maximum frequency (55 to 66 Hz) factory set at 60 Hz.
 - b. Minimum frequency (6 to 35 Hz) factory set 6 Hz.
 - c. Acceleration (2 to 20 seconds) factory set at 20 seconds.
 - d. Deceleration (2 to 20 seconds) factory set at 20 seconds.
 - e. Volts/Hertz ratio factory set for 460V at 60 Hz.
 - f. Voltage offset or boost factory set at 100% torque.
 - g. Current limit (50% of 110% sine wave current rating) factory set at 100% current.
5. Door mounted operator controls.
 - a. Auto/manual switch.
 - b. Start/stop (reset) switch.
 - c. Manual speed control.

6. Automatic mode, controller will follow an external signal and respond to remote start-stop contact wired to terminal strip. LED's will be door mounted and will indicate power on, drive fault, motor running and external fault.
7. Input disconnect: Provide a positive disconnect between the controller and all phases of the incoming A-C line. This disconnect shall be designed to mount inside the controller enclosure and include a mounting bracket and through-the-door interlocking handle with provisions for padlocking.
 - a. The basic switch shall be thermal magnetic, molded case circuit breaker.
- D. Motor overload: Contains thermal overload relay designed to protect one A-C motor, operated on AFC output, from extended overload operation.
- E. Isolated Process Control Interface: Enables the AFC to follow a 0-5, 1-5, 4-20 10-50 ma; 1-4, 0-8, 0-10 VD-C grounded or ungrounded signal from a process controller.
- F. Voltage, current and Frequency Meters: Provide to indicate the output voltage, output frequency and output current.
- G. Plug-in Tester Card: Provide a quick means for monitoring the different signals within the AFC for start-up and troubleshooting. The tester card printed circuit board shall be a 44 pin type which can be plugged into AFC regulator rack. One tester shall fit all AFC units.
- H. Provide shielded isolation transformer to change voltage from 208V/3PH/60Hz input to 460V/3PH/60 Hz output, for supply fans only.
- I. The AFC shall have an auxiliary contact that will send a run/start indication to the temperature control system.

2.02 LINE REACTORS

- A. Provide line reactors for wiring upstream of the AFC. The reactors shall be sized for the maximum current of the drive with the reactance to match the AFC.

PART 3 - EXECUTION

3.01 INSTALLATION OF VARIABLE FREQUENCY DRIVES AND MOTORS

- A. Install AFC and motors as indicated, in accordance with manufacturer's written instruction, applicable requirements of NEC, NEMA Standards, and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Coordinate with General Contractor and Division 16 Contractor for installation and wiring of AFC's and motors.
- C. Ensure three phase motors are rotating in correct direction.
- D. Provide positive electrical equipment and motor groundings.

3.02 ADJUST AND CLEAN

- A. Inspect operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.
- B. Touch-up scratched or marred surfaces to match original finish.

3.03 FIELD QUALITY CONTROL

- A. Subsequent to wire/cable hook-up, energize motor starters and motors, and demonstrate functioning of equipment in accordance with requirements, were necessary correct malfunctioning units.

3.04 START-UP AND WARRANTY SERVICES

- A. The manufacturers shall provide start-up services, completely checking out the operation and performance of the variable frequency drive. Manufacturer shall furnish Owner with Operation and Maintenance instructions including four (4) sets of operations and maintenance manuals with full parts list.
- B. The manufacturers shall provide a one-year full parts and labor warranty from date of start-up and owner acceptance.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15652 - ELECTRIC CABINET HEATER

PART 1 - GENERAL

1.01 SCOPE

- A. Basic unit construction shall be blow-thru design with motor and fans in the air stream below the coil. Unit shall be 9 3/4" deep. All internal surfaces shall be painted.
- B. Electric heating elements shall have finned steel sheaths.
- C. Blower shall be directly connected to a two-speed permanent split capacitor (PSC) motor. Motors shall include built-in thermal overload protection. Entire blower and motor assembly shall be arranged for easy removal from the chassis.
- D. Controls shall include contactor(s) to energize the heating coil, a high limit switch to interrupt heating if operating temperature becomes abnormally high, and a two-speed blower with unit mounted speed switch, interlocked to prevent heater operation, unless the speed selector has the blower operating at either high or low speed.
- E. Control arrangements shall include a remotely located 24 volt thermostat. Mechanical contactors shall be factory installed to control the heating elements. Field power connections are made to a circuit breaker which is to provide short circuit protection and a means of disconnecting all power within the unit. Units are to be supplied with double circuited heating elements and include two circuit breakers as standard.
- F. Outdoor air dampers which will allow 0-100% of fresh air to be brought into the unit are to be provided.
- G. Outdoor air intakes are of aluminum construction. These intakes are three-bricks high for 100 percent outdoor air. They shall be applied with the overlapping front cover plate (for either masonry or panel wall application).
- H. Air filters (1" thick) of throw-away, permanent, polyurethane, and renewable types shall be provided.
- I. Duct collar shall be supplied as a component part of inlet grilles.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15657 - ELECTRICAL WORK

1.01 GENERAL

A. The Contractor shall furnish all labor and material required for the installation of the systems. A brief description of the work is as follows.

a. Furnish all electrical feeders, circuit, and control wiring for the new burner and boiler controls utilizing existing boiler/burner feeds where possible.

b. Furnish all electrical connections for new oil fired separate domestic water heater inclusive of aquastats and circulator operation for recirculation lines.

c. All cutting, patching, and painting as required.

d. All controls for burners as specified inclusive of disconnect switches.

e. Testing of all wiring as directed.

B. Drawings:

1. The Contractor shall submit six (6) copies of each new item, bill of material, drawings, and wiring diagrams for approval prior to the installation of the equipment. These shall be certified factory drawings prepared by the manufacturer specifically for this project. Stock drawings or field drawings pertinent to other projects will not be acceptable.

ALL ELECTRICAL WORK SHALL MEET THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

END OF SECTION

Division 15 - Mechanical

Section 15670 - Split System Condensing Units

Size Range:

25 to 130 Nominal Tons at 60 Hz

88 to 457 Nominal kW at 60 Hz

21 to 108 Nominal Tons at 50 Hz 73 to 381 Nominal kW at 50 Hz

Carrier Model Number:

38APD, 38APS

Part 1 - General

1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit with Puron® refrigerant (R-410A) suitable for on-the-ground or rooftop installation. The 38APS unit shall have one refrigeration circuit and shall consist of two or three rotary scroll compressors. The 38APD unit shall have two independent refrigeration circuits and shall consist of two, four, five or six rotary scroll compressors. Unit shall have air-cooled coils, propeller- type condenser fans, a control box, and shall discharge condenser air vertically upward as shown on certified drawings. Unit shall be used in refrigeration circuit with a central station air-handling unit or direct-expansion coils.

1.02 QUALITY ASSURANCE

- A. Unit performance shall be rated in accordance with AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Standard 365, latest edition (U.S.A).
- B. Unit construction shall comply with latest edition of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 15 Safety Code, UL 1995, and ASME (American Society of Mechanical Engineers) applicable codes (U.S.A. codes).
- C. Unit shall be manufactured in a facility registered to ISO (International Organization for Standardization) 9001 Manufacturing Quality Standard.
- D. Base unit shall be constructed in accordance with UL (Underwriters Laboratories) standards and CSA (Canadian Standards Association).
- E. Unit cabinet shall be capable of withstanding 500-hour salt-spray exposure per ASTM (American Society for Testing and Materials) B117 (scribed specimen).
- F. Design pressure shall be 650 psig (4482 kPa).
- G. Unit shall be functional checked at the factory.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package and shall be stored and handled per unit manufacturer's recommendations.

Part 2 - Products

2.01 EQUIPMENT

- A. General:
Factory assembled, single-piece, air-cooled condensing unit. Contained within the unit enclosure shall be all factory wiring,

pipng, controls, compressors, nitrogen holding charge, and special features required prior to field start-up.

B. Unit Cabinet:

1. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
2. Cabinet shall be capable of withstanding 500-hr salt spray test in accordance with ASTM (U.S.A.) B-117 standard.
3. Control box access panels shall be hinged for service access.
4. Lifting holes shall be provided to facilitate rigging.

C. Fans:

1. Condenser fans shall be direct-drive propeller type, discharging air vertically upward.
2. All condenser fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation and internal, automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
3. Shafts shall have inherent corrosion resistance.
4. Fan blades shall be statically and dynamically balanced.
5. Condenser-fan openings shall be equipped with PVC-coated steel wire safety guards.

D. Compressors:

1. Compressors shall be rotary scroll.
2. Operating oil charge and a crankcase heater control oil dilution.
3. Compressors shall be mounted on two rails having rubber in shear vibration isolators.
4. Staging of compressors shall provide unloading capability. Digital compressor unloading control shall be available as an option on one circuit (not available on size 065 unit).
5. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.

E. Condenser Coils:

1. Coil shall be air-cooled microchannel heat exchanger (MCHX) and shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds in combination with a corrosion-resistant coating on the tubes.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 650 psig (4482 kPa).

F. Refrigeration Components:

1. Refrigeration circuit components shall include liquid line temperature relief device, pressure transducers, liquid line shutoff valve, suction shutoff valve, suction line accumulators, nitrogen holding charge, and compressor oil.
2. Long line length check valves are required for liquid line installation on all linear line length applications of more than 100 ft (30.5 m) to prevent liquid migration during unit shutdown. For any 025-030 size dual circuit unit application where evaporator is located higher than the

- condensing unit, check valves are required for linear line length above 55 ft (16.8 m).
3. Units shall include one factory-installed suction line accumulator for each refrigerant circuit.
- G. Controls and Safeties:
1. Unit *ComfortLink* controls shall include:
 - a. Scrolling marquee display module shall be used for accessing condensing unit information, reading sensor values, and testing the condensing unit. The scrolling marquee display is a 4-key, 4-character, 16-segment LED (light-emitting diode) display. Eleven mode LEDs shall be located on the display as well as an Alarm Status LED. The display shows all of the *ComfortLink* control codes (with 60-character expandable clear language), plus set points, time of day, temperatures, pressures, and superheat. Additional information can be displayed all at once with the accessory Navigator™ display.
 - b. Carrier Comfort Network® (CCN) system capability.
 - c. Unit control with standard pressure transducer, discharge pressure transducer and suction temperature thermistors.
 - d. Current alarm list and alarm history list on display.
 - e. Automatic compressor lead/lag control.
 - f. Service run test capability.
 - g. Compressor minimum run time (3 minutes) and minimum off time (3 minutes).
 - h. Service diagnostic mode.
 - i. Self-contained low voltage control circuit.
 - j. Cycle condenser fans to maintain proper head pressure control.
 - k. Capacity control with staging compressors.
 - l. Optional digital scrolls to stage compressors and cycle digital compressor for maintaining desired leaving air temperature set point.
 - m. Alarm relay output to indicate when unit is in alarm condition.
 2. Minimum unit safety devices shall include:

Solid-state compressor lockout to provide optional reset capability at the space thermostat if any of the following safety devices trip and shut off compressor.

 - a. Compressor lockout protection for internal or external overload.
 - b. Low pressure protection.
 - c. High pressure protection (high pressure switch or internal).
 - d. Compressor reverse rotation protection.
 - e. Loss of charge protection.
 - f. Low suction superheat protection.
 - g. Short cycle protection.
 - h. Suction and discharge pressure transducers.
 - i. Circuit breakers or fuses for short circuit protection of compressors.

- H. Operating Characteristics: (Refer to Schedule on Drawings)
1. The capacity of the condensing unit shall meet or exceed _____ Btuh (____kW) at a suction temperature of _____ F (____C). The power consumption at full load shall not exceed _____ Btuh (____kW).
 2. The combination of the condensing unit and the evaporator or air-handling unit shall have a total net cooling capacity of _____ Btuh (____kW) or greater at conditions of _____ cfm (____L/s) entering-air temperature at the evaporator at _____ F (____C) wet bulb and _____ F (____C) dry bulb, and air entering the condensing unit at _____ F (____C).
 3. The system shall have an Energy Efficiency Ratio (EER) of _____ Btuh/watt or greater at standard AHRI conditions.
- I. Electrical Requirements:
- All unit power wiring shall enter unit cabinet at a single location (115 and 130 size units available with dual point power with terminal block).
- J. Special Features:
1. Low Ambient Control:
 - a. Control shall regulate fan motor speed in response to the saturated condensing temperature of the unit. The control shall be capable of operating with outdoor temperatures at -20 F (-28.9 C).
 - b. Motormaster® low ambient control shall be available as a factory-installed option or field-installed accessory for all units.
 2. Optional E-Coated MCHX Condenser Coil:

E-coated aluminum microchannel coils shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02. E-coated products shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI (National Sanitation Foundation/American National Standards Institute) 51-2002 Method 10.2 (U.S.A. Standards). E-coated aluminum microchannel coils shall be capable of withstanding an 8,000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 Standard.
 3. Sound Reduction:
 - a. Low sound fan for sound reduction is available as a factory-installed option or field-installed accessory for all units.
 - b. Low sound compressor blankets for additional sound reduction are available as a factory- installed

option on all units having low sound fans or as a field-installed accessory.

4. Digital Compressor Option:
Modification shall include digital compressor to provide incremental steps for tighter temperature control. The digital compressor shall be available as a factory-installed option for all units except size 065.
5. Non-Fused Disconnect:
A non-fused disconnect is available as a factory-installed option for all units having single point power connection units.
6. Long Line Length Check Valves:
Long line length check valves are available as factory-installed options or field-installed accessories on all units.
7. High Short Circuit Current Rating (SCCR):
The optional high SCCR interrupt capability shall allow the unit to tolerate a 65 kA (208/ 230v, 380v and 460-v units) or 25 kA (575-v units) short circuit current for a brief period of time while protecting downstream components. The high SCCR option shall provide a higher level of protection than the standard unit (option for 60 Hz only). High interrupt shall be available as factory-installed option on all units.
8. Navigator™ Hand Held Display:
 - a. Portable hand held display module with a minimum of 4 lines and 20 characters per line, of clear English, French, Spanish, or Portuguese language.
 - b. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted.
 - c. RJ-14 connection plug shall allow display module to be connected to factory-installed receptacle.
 - d. Industrial grade coiled extension cord shall allow the display module to be moved around the unit.
 - e. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation.
 - f. Display module shall have NEMA (National Electrical Manufacturers Association, U.S.A.) 4x housing suitable for use in outdoor environments.
 - g. Display shall have back light and contrast adjustment for easy viewing in bright sunlight or night conditions.
 - h. Navigator module shall have raised surface buttons with positive tactile response.
 - i. Navigator module shall be available as field-installed accessory for all units.
9. BACnet Communication Option:
The BACnet Communication option shall provide factory-installed communication capability with a BACnet MS/TP

network. Allows integration with i-Vu® Open control system or a BACnet building automation system.

10. BACnet Translator Control:
BACnet control shall be available as a field-installed accessory for all units to provide interface between unit and a BACnet Local Area Network (LAN, i.e., MS/TP EIA-485).
11. LON Translator Control:
Unit shall be supplied with field-installed interface between the chiller and a Local Operating Network (LON, i.e., LonWorks FT-10A ANSI/EIA-709.1). LON shall be available as a field-installed accessory for all units.
12. Touch Pilot™ Display:
Touch Pilot remote mount touch screen display for network attachment to the unit shall be available as a field-installed accessory for all units.
13. Energy Management Module (EMM):
The EMM shall provide remote set point, demand limit control, and percent capacity input. The EMM is not needed with use of BACnet or LON accessory kit.
14. Remote Enhanced Display Accessory Kit:
The remote enhanced display accessory kit shall contain a remotely mounted 40-character per line, 16-line display panel for unit diagnostics.
15. Security Grilles/Hail Guards:
Units shall be supplied with factory-installed or field-installed louvered, sheet metal panels which securely fasten to the unit to provide condenser coil protection against hail and physical damage.
16. Vibration Isolation Pads:
Neoprene vibration isolation pads (24 in. x 3 in. x 1/4 in.) shall be available for field installation to reduce vibration transmission from the compressor through the floor and into the conditioned space.
17. Wind Baffle Kit:
Field-installed accessory kit shall provide wind baffles for use with low ambient temperature operation.

DIVISION 15 - MECHANICAL

SECTION 15768 - UNIT VENTILATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary conditions and Division 1 Specification sections, apply to work of this section.

1.02 SUMMARY

- A. Extent of unit ventilator work indicated on drawings and schedule by requirements of this section.
- B. Unit ventilators specified in this section include the following:
 - 1. Hot water-heating coil.
 - 2. Steam Heating Coil
 - 3. Chilled water-cooling coil (where applicable).
 - 4. DX Cooling Coil (where applicable).
- C. Related Sections: Refer to other Div. 15 sections for the following:
 - 1. Hot/Chilled water piping
 - 2. Refrigerant Piping
 - 3. Steam Piping
- D. Other divisions: Refer to Div. 16 sections for the following:
 - 1. Power wiring.

1.03 SUBMITTALS

- A. Product data - submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, weights, furnished specialties and accessories, and installation and start-up instructions.
- B. Shop drawings - submit manufacturer's assembly type shop drawings indicating dimensions, weight loadings, required clearances and methods of assembly of components. Wiring diagrams - submit manufacturer's electrical requirements for power supply wiring for packaged heating and cooling units. Submit manufacturer's ladder type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- C. Maintenance data - submit maintenance data and parts list for each unit ventilator, control, and accessory, including "trouble-shooting" maintenance guide. Include this data and product data in maintenance manual.

1.04 QUALITY ASSURANCE

- A. Refer to section 15020 "Quality Assurance." Part 1, Item A for requirements pertaining to substitute material and equipment.
- B. 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.
- C. Comply with ARI 440 for testing and rating units.
- D. Comply with ASHRAE 33 for testing hydronic coils.
- E. Comply with NFPA 70 for components and installation.
- F. UL Compliance - provide unit ventilators which are listed by UL and have UL label affixed.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace unit ventilators that fail in materials and workmanship within 1 year from date of substantial completion.

1.06 EXTRA MATERIALS

- A. Furnish extra materials described below that match product installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Unit Ventilator Filters: Furnish 2 spare filters for each filter installed.
 - 2. Motors: Furnish (2) spare motors for each size unit ventilator motor size used on the project.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle unit ventilators and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged packaged heating and cooling units or components, replace with new.
- B. Store unit ventilators and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Magic Aire / Carrier
2. McQuay International
3. Trane Company (The): North American Commercial Group
4. Carrier Corp.

2.02 UNIT VENTILATORS

- A. Description: A vertical, floor-mounting assembly including cabinet, filter, coil, fan and motor in draw-through configuration with the following:

1. Heating coil
2. Cooling coil (where applicable)
3. Temperature controls (field installed)

2.03 MATERIALS

- A. Unit Frame: Welded, galvanized heavy gage steel.
- B. Insulation: 1-inch (25mm) duct liner complying with ASTM C1071 and attached with adhesive complying with ASTM C916.
1. Fire-Hazard Classification: Duct liner and adhesive shall have a maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E84.
- C. Drain Pans: Galvanized steel, with connection for drain. Drain pan shall be insulated with polystyrene or polyurethane insulation.
- D. Cabinet: Galvanized steel, with removable panels fastened with tamperproof fasteners and key-operated access door.
- E. Cabinet Finish: Phosphatize coat with baked-on primer and manufacturer's standard paint, in color selected by Architect.
- F. Cabinet Top: Galvanized steel, with baked enamel finish.
- G. Discharge Air: Welded steel linear bar grille.
1. Air-Outlet Location: Top
- H. Outdoor Louver: Types and sizes as scheduled with the following features and provisions:
1. Horizontal wall intake louver.
 2. Construction: Aluminum.
 3. 1/2-inch (13 mm) mesh screen on interior side of intake.
 4. Finish: Color by Architect.
 5. Protective grille for louver - Color by Architect.

- I. Mixing Dampers: Steel damper blades with edge and side seals and nylon bearings, operated by factory-mounted operator to control outside-air/return air.
- J. Face and Bypass Dampers (Where applicable): Steel damper bladed with edge and side seals and nylon bearings, operated by factory-mounted electric operator.

2.04 COILS

- A. Hot Water / Steam Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch (2.5 mm) and rated for a minimum working pressure of 300 psig (2068 kPa) and a maximum entering water temperature of 275 deg. F (135 deg. C) with manual air vent and drain plug.
- B. Chilled Water Coil: Copper tube, with mechanically bonded aluminum fans spaced no closer than 0.1 inch (2.5 mm) and rated for a minimum working pressure of 200 psig (1378 kPa) with manual air vent and drain plug.

2.05 FAN

- A. Centrifugal, with forward-curved wheels and fan scrolls made of galvanized steel or thermoplastic material; directly connect to motor.

2.06 FAN MOTORS

- A. Permanent split capacitor multispeed motor with integral thermal-overload protection and resilient mounts. Connect motor to chassis wiring with plug connection.

2.07 FILTERS

- A. Filters: 1-inch (25-mm) thick, glass-fiber media.

2.08 ACCESSORIES

- A. Storage Cabinets:
 - 1. Material: Bottom, back and sides of cabinet to be 18-ga. Steel. Fully adjustable shelves to be 18-ga. Steel. Unit base to be 16-ga. Steel.
 - 2. Cabinet to have open space with false back for piping and electrical circuits.
 - 3. Finish: powder coat finish with color selected by architect.
 - 4. Units to be provided with sizes and quantities shown on architectural drawings.

2.09 CONTROL SYSTEMS

- A. Automatic Temperature Controls: Field installed controls to be furnished as described under section 15903 of this specification. In addition to section 15903, the following control items shall be included:
1. Provide occupant adjustment capability for the following:
 - a. Room temperature set point.
 - b. Minimum outside-air percentage.
 - c. Unoccupied room temperature set point.
 2. Controls components shall include the following:
 - a. Thermistor mounted in unit return air with manual adjustable override.
 - b. Ventilation lockout relay to close ventilation damper during occupied operation.
 - c. Exhaust fan interlock relay to open outside damper when exhaust fan is on or to open depressurization damper when outdoor air damper is open (dampers to operate in parallel).
 - d. Day-night control switch.
 - e. Day-night control relay for remote signal.
- B. Safety Devices: Each unit shall have the following safety devices:
1. Manual disconnect switch.
 2. Spring-loaded interlock de-energize control circuit, fan, and heating elements when front panel is removed.
 3. Heat-dissipation switch keeps fans running when unit discharge temperature rises above 100 deg. F (38 deg. C).
 4. Overcurrent protective fuses.
 5. Branch-circuit fusing to protect heating-element subdivision circuits (maximum 48 A).
 6. Motor and control circuit fuses.
 7. Low-temperature, cutout thermostat strapped to air coil prevents coil from freezing and liquid from slugging.
- C. Control Devices: Field mount the following devices:
1. Outside-air damper actuator.
 2. Discharge air thermostat.
 3. Heating-coil valve.
 4. Cooling-coil valve (where applicable).
 5. Face and bypass damper actuator (where applicable).
 6. Room thermostat.
 7. Freeze protection thermostat.
 8. Cooling lockout thermostat.

2.10 SOURCE QUALITY CONTROL

- A. Verification of Performance: Test and rate condensing units according to ARI 210/240.
- B. Test unit ventilator coils according to ASHRAE 33.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install unit ventilators to comply with NFPA 90A.
- B. Install wall-mounting thermostats and switch controls in electrical outlet boxes at heights to match lighting controls.
- C. General Contractor to install storage cabinets per architectural drawings/details.

3.02 CONNECTIONS

- A. Unless otherwise indicated, install shutoff valve and union or flange at each connection.
- B. Install piping adjacent to machine to allow service and maintenance.

3.03 FIELD QUALITY CONTROL

- A. Testing: Perform the following field quality control testing and report results in writing:
 - 1. After electrical circuitry has been energized, start units to conform proper motor rotation and unit operation.
 - 2. Test and adjust controls and safeties.
- B. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15802 - INSPECTION TESTING, AND BALANCING

1.01 GENERAL

- A. All tests shall be conducted in the presence of a representative of the Owner and/or the Architect, by a qualified vendor specializing in balancing of air systems.
- B. The H.V.A.C. systems shall be adjusted, balanced, and set so as to provide the temperature and air volumes required and as shown on the drawings.
- C. The Contractor shall demonstrate that all air distribution systems and apparatus fulfill the requirements of the specifications and shall operate the equipment for a sufficient time to properly adjust the controls and conscientiously instruct the Owner's representatives in the care and operation of the systems.
- D. The Contractor shall obtain and pay for all required inspections and permits required by State Ordinances and by the NBFU and provide all required testing equipment. All equipment shall be properly calibrated.
- E. The Contractor shall refer to ASHRAE handbook, "Testing, Adjusting, and Balancing" A.A.B.C. and N.E.B.B. required testing procedures.
- F. Balance all systems to design ratings, record pressure drop readings across all major systems, and make flow and pressure measurements.
- G. Record all measurements, complete all flow diagrams, and submit complete to the Architect.

1.02 SCOPE

- A. This section outlines the recommended test and inspection procedures to be followed in the inspection of any H.V.A.C. plant prior to acceptance and subsequent operation. In addition, the areas of responsibility are defined such that all tests and inspections are conducted in a manner to assure that the system meets the requirements of all applicable codes.

1.03 PRELIMINARY PROCEDURES

- A. It shall be the responsibility of the Contractor to complete the following work prior to conducting and tests:
 - 1. Installation of the system(s) and all applicable controls and accessories as outlined in the specifications and/or drawings.
 - 2. Ensure all wiring is permanently affixed. Temporary wiring and/or connections will not be permitted during testing.

- B. It shall be the responsibility of the Contractor, under the direction of the Architect, to perform electrical continuity tests only to ascertain that the field wiring is correct from the H.V.A.C. equipment control panel terminal strip to the H.V.A.C. equipment controls.

1.04 TESTS

- A. Test all electrical components, including starters and heaters, overload equipment, scanner system, all controls, valves, and safety equipment.
- B. Test all circulation air portions of the air distribution system(s).
- C. Provide a list of all components that have been satisfactorily tested. Notify the Architect, in writing, a week in advance of this test so as to permit his attendance.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15890 - DUCT CLEANING

PART 1 - GENERAL

1.01 SUMMARY

Section includes:

1. Removal and disposal of visible dirt, debris, and other contaminants.
2. Cleaning and decontamination of all supply, return and exhaust ductwork, diffusers, grilles and registers.
3. Chemical pressure washing and decontamination of all heating and cooling coils.
4. Cleaning and decontamination of dampers, supply air fans, exhaust air fans and other components of the HVAC systems.
5. Removal, disinfection, and/or sealing the supply duct lining if applicable with an anti-fungicidal coating as specified in the project drawings.
6. Verification and updating of working drawings.

1.02 SUBMITTALS

- A. Product data for each product specified in this section.
- B. Material safety data sheets for all products used.
- C. Project Record Documents:
 1. Upon completion of the project, submit one set of red-marked, duct layout drawings showing the location of all new access openings installed in the duct systems to accommodate the cleaning process.
- D. Qualifications, schedules and reports:
 1. Qualification and experience documentation
 2. Project schedule and procedures
 3. Final report (3 copies)
 4. Product-Data:
 5. Submit manufacturer's data sheets, including Material Safety Data Sheets (MSDS) if applicable, for the following:
 - a. Air-tight plastic closure plugs
 - b. Vacuum cleaning machines and/or cleaning related equipment and accessories
 - c. Biocide sanitizing fluid
 - d. Anti-fungicidal duct work sealant
 - e. Others as applicable

1.03 QUALITY ASSURANCE

- A. All work in this section shall be performed by an independent specialty HVAC duct-cleaning contractor. The contractor shall be certified by NADCA (National Air Duct Cleaners Association). Submit information indicating qualifications and experience.
- B. Conform to NFPA 90A.

- C. Conform to the requirements of the following standards that do not conflict with regulatory requirements or requirements of the contract documents:
 - 1. SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
 - 2. NADCA "General Specifications for the Cleaning of Commercial Heating and Ventilation Systems."
- D. Factory-Made Products - Listed by Underwriters Laboratories, Inc. (UL).
- E. Video/photographic documentation before and after the cleaning process.
- F. EPA registration for fungicide coating.
- G. A project closing report shall be submitted upon completion of the entire cleaning project. Report shall include a dated summary of the duct systems and HVAC unit inspections and approvals by the Owner's designated representative. Project closing report shall be bound, neatly presented and organized according to HVAC unit, duct system or fan. Also include photographic documentation (min. 3" x 5" color prints) of before and after conditions of each system component or section.

1.04 FIELD MEASUREMENTS

- A. Field measure related work to ensure proper fit and clearance.
- B. Field measure existing work to ensure proper fit and clearance.

PART 2 - PRODUCTS

2.01 DUCT ACCESS PATCHES

- A. Premanufactured sheet metal patches that are crossbroke, hemmed and predrilled, with insulation to match ductwork.

2.02 DUCT ACCESS DOOR

- A. Premanufactured insulated access door with locking seal. Install at all coils, fans and equipment.

2.03 DUCT SEALER

- A. Product specifically rated for sealing ductwork meeting NFPA requirements.
- B. Seal modifications to existing ductwork in accordance with duct sealing described in SMACNA "HVAC Duct Construction Standards, Metal and Flexible."

2.04 HVAC DISINFECTANT/CLEANER

- A. EPA registered formula for disinfection and cleaning of HVAC equipment equal to Foster Products 40-80.
- B. Stabilized chlorine dioxide - Oxine or approved equivalent.

2.05 FUNGICIDAL PROTECTIVE COATING

- A. EPA registered polyacrylate emulsion specifically formulated for long-term fungicidal activity and HVAC application. Equal to Foster Products 40-20.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine elements and surface intended to support products.
- B. Verify that each product conforms to regulatory requirements and to specification requirements.
- C. Correct any unsatisfactory conditions before installing products of this section.

3.02 EQUIPMENT

- A. HEPA filtered vacuum collector system capable of maintaining up to 1.0 inch of static pressure inside the isolated area of ductwork.
- B. HEPA filtered wet/dry vacuums.
- C. Air compressor as required.
 - 1. The specific air or water pressure selected by the Contractor for air or water washing of various HVAC system components shall be appropriate to the item and component being washed. Water pressure utilized shall not exceed 1,000 psig.
 - 2. Contractor shall repair or replace any system component damaged as a result of using excessive air or water pressure.
- D. Rotary brush system for mechanical cleaning of ductwork.

3.03 PREPARATION

- A. The location of each access opening shall be shown and identified with a red-marked on a blue-lined print of the duct system layout drawings by duct cleaning contractor.
- B. Air volume control devices.
 - 1. Damper and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.
- C. Seal off ends and openings of any ductwork not being immediately worked on.
- D. Isolate duct section to be worked upon, by using Protective seal barriers within the ductwork, to prevent loose dirt and debris from migrating to cleaned sections of the duct system.

- E. Protect surrounding elements from damage and disfigurement resulting from work of this section.
- F. Synthetic filter media (one inch thick 30% efficiency), or approved other, shall be temporarily fitted over each register, grille and diffuser in the duct system to intercept any migrating loose dirt and debris.
- G. Each work area shall: be protected from being soiled with polyethylene plastic sheet. A protective sheet shall cover all furniture in each room of the work area. Furniture, in the case of laboratory rooms, shall, include all laboratory benches, fume hoods, desks, and related laboratory equipment. Upon completion of the duct system cleaning in each work area, protective sheeting shall be carefully removed with collected dirt and debris disposed of in an approved manner. Vacuum clean floors and other areas in each room restoring each room to its original clean condition.
- H. Suitably support and brace any ductwork, which will be entered by personnel.
- I. Any person entering the ductwork must have confined space training.

3.04 SEQUENCE OF CLEANING AND DECONTAMINING DUCTS

- A. All work shall be conducted during unoccupied times and shall be coordinated with the designated owners' representative.
- B. Take the fans off energy scheduling and allow them to run 24 hours except when the ductwork is being cleaned.
- C. Clean the outside air intake grille and shaft.
- D. Clean the return air ducts starting at the outer ends of the return air system and concluding at the mixed air chamber and the exhaust stack.
- E. Clean the interior of the air handling unit.
- F. Install products in compliance with manufacturer's instructions.
- G. Pre-vacuum diffusers, grills and registers in the ductwork. If necessary, remove, chemically wash/clean and reset (not required for existing diffusers to be replaced).
- H. Existing ductwork and insulation shall be neatly cut as required to provide access to facilitate cleaning of the ductwork and components. As necessary, protect downstream areas from receiving particulates during the installation of access points.
- I. Install vacuum collector unit at a predetermined location and clean the section of ductwork using omnidirectional air nozzles and rotary brushes as necessary. Large crawlable ducts may be hand vacuumed or brushed and air washed.
- J. Clean the supply ductwork starting from the supply fan and ending at the supply diffuser. At no point should uncleaned ductwork be upstream from clean ductwork.
- K. The Owner's designated representative shall approve location of access openings.
- L. Existing duct access panels shall be used wherever possible.
- M. Upon completion of the cleaning operation, the round access openings shall be plugged air-tight with plastic caps designed for this purpose.
- N. The rectangular access openings shall be closed using an overlapping galvanized sheet metal, or material to match existing ductwork, cover (cross broken) of the same gauge thickness as

existing duct. Rectangular cover shall be fastened using self-tapping sheet metal screws with a silicone bead sealing gasket; or 3M No. 1202-T sealant tape used as a sealing gasket, at perimeter of cover. Seal all joints air-tight.

- O. Where ducts are provided with exterior insulation, neatly cut and remove insulation as required to accommodate required duct access openings. When complete, reinsulate at ducts at access points and install new vapor barriers to match existing.
- P. Visually inspect the duct interior prior to cleaning each duct section. Use a fiber-optic borescope to accomplish the inspection task for all smaller ducts not otherwise accessible.
- Q. Wash and vacuum clean each duct section:

Lined Ducts: Air pressure wash and vacuum or rotary brush and vacuum. The cleaning process shall not degrade the insulation. Damaged insulation will be replaced or repaired at the discretion of the owners Representative.

- 1. Fog the interior of the ductwork with Oxine and allow to dry.
- 2. Upon completion of the cleaning of each lined duct section, seal the surface of the lined duct with Foster 40/20 or an approved white encapsulant equivalent.

Unlined Ducts: Air pressure wash and vacuum or rotary brush and vacuum. Hand wipe or hand vacuum if space allows. Fog the interior of the ductwork with Oxine and allow to dry.

- R. Visually inspect each duct section using a borescope where necessary, to ensure the duct section is clean.
- S. All registers, grilles and diffusers shall be removed, vacuum cleaned, washed and then reinstalled.
- T. Clean ceiling around all registers, grilles and diffusers.
- U. After duct section and reheat coils have been completely cleaned and sanitized, a final visual inspection, using a fiber-optic borescope as required, shall be accomplished with the Owner's designated representative for conditional approval. At this time, an owners' representative will take samples for mold contamination. The cleaning will receive final approval if the total fungal counts on a surface Rodac plate sample taken from the surface of the duct do not exceed 50 colony forming units on any plate. Verbal confirmation of the clearance surface sampling results will be given seven days after the final surface sample results are taken. If the desired cleaning effectiveness is not achieved, the area will have to be re-cleaned by the Contractor. The results of the cleaning effectiveness will be included in the final report. The cleaning contractor shall provide all ladders, lighting, fiber-optic borescope, and other miscellaneous equipment required to permit the owner's representative to inspect all portions of the project.
- V. Repeat the cleaning process described above for succeeding duct sections until entire duct system is completely clean.
- W. Verify that the building's air supply and return system is properly balanced.

- X. Duct Access Doors:
 - 1. A certified sheetmetal worker shall install all duct access doors.
 - 2. Install duct access doors on the side of duct where adequate clearance is available.
 - 3. Install duct access doors at other locations requiring access to duct interior for inspection, cleaning, adjusting, maintenance and operation.
 - 4. Size: 18 inches by 16 inches unless duct is too small for this size.
- Y. Install duct test holes as required.

3.05 CLEANING HVAC EQUIPMENT

- A. Isolate HVAC unit housing from adjacent equipment and building room surfaces with polyethylene sheet.
- B. Protect all motors, bearing assemblies, and belt drive assemblies within the HVAC unit housing with taped-on polyethylene sheet to prevent intrusion of potentially damaging wash water.
- C. Remove filters/filter media from holding frames and dispose of in an approved manner. Install new filter media after cleaning operation is complete, in accordance with filter manufacturer's instructions to insure a leak-free installation. Do not restart fans until all filters have been installed and inspected by owner representative.
- D. Vacuum clean entire internal space of HVAC unit, including each component including component supports, frames, mounts, etc. contained therein, to remove loose dirt and debris.
- E. Pressure wash, using an EPA approved cleansing agent, each HVAC unit. This shall include all the internal surfaces of the HVAC unit housing and all the internal components of the HVAC unit including fans, cooling and heating coil banks, filter bank support frames, and contiguous control damper assemblies.
- F. Pressure washing of the heating and cooling coil banks shall be accomplished at both the upstream and downstream faces of the coils.
- G. Where deemed necessary by the Cleaning Contractor, cleansing agent solution may be separately supplied prior to pressure wash.
- H. Hand scrub where required to remove all residual dirt.
- I. Rinse thoroughly with clear water to remove any residual dirt and cleansing agent.
- J. Fan casings and impeller wheels shall be cleaned on all surfaces, inside and outside.
- K. Vacuum clean all pressure washed surfaces. Vacuum collected wash water shall be disposed of outside of the HVAC unit.
- L. A visual inspection of the HVAC unit, including all of its internal components shall be performed by the Owner's designated representative together with the Cleaning Contractor. At this time, an owner designated representative will take samples for mold contamination. The cleaning will receive final approval if the total fungal counts on a surface Rodac plate sample does not exceed 50 colony forming units on any plate. If the desired cleaning efficiency is not achieved, the area will have to be re-cleaned by the Contractor. Include this data in the final report.

3.06 APPLICATION OF FUNGICIDAL PROTECTIVE COATING

- A. Apply fungicidal protective coating as per manufacturer's instructions with the HVAC system on interior fiberglass insulation that was previously cleaned and disinfected.
- B. Do not coat coils, filters, controls or fans.
- C. If the interior of a VAV box is encapsulated, the controls on the box must be protected from the encapsulant. The performance of the box must not be compromised by the duct cleaning.

3.07 FIELD QUALITY CONTROL

- A. Inspect installed products to observe damage.
- B. Test and demonstrate as required by the governing authority.
- C. Do not allow discharge air from the fungicidal coating process to enter occupied spaces.
- D. Ceiling and wall surfaces that are damaged by this work shall be replace or repaired as required.
- E. Restore to marked position all dampers and any air directional mechanical devices.
- F. Final Purge.
 - 1. Work Area Preparation
 - a. Cover all terminal air outlets (diffusers, registers, grilles, etc.) with synthetic filter media at least 30% efficient. Tape filter to terminal device frame to eliminate air leakage.
 - 2. Purge Procedure
 - a. Inform Owner's designated representative that outlets have been covered with synthetic filter media at least 30% efficient.
 - b. Insure all filters have been properly installed.
 - 3. After receiving verbal confirmation about attainment of proper cleaning efficiency from an owner representative start HVAC units and in the event of variable speed/volume systems operate unit up and down between low and high speed to dislodge dirt and debris. Perform purge operation continuously for minimum of 1 hour.
 - 4. Clean-Up:
 - a. Remove synthetic filter media from air terminal outlets, and wash and dry outlet frame with approved cleaning solution.
 - b. Vacuum and clean work areas to original condition.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15891 - DUCTWORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Extent of ductwork is indicated on drawings and by requirements of this section.
- B. Types of ductwork required for project include the following:
 - 1. Heating supply and return air systems.
 - 2. Air conditioning supply and return air systems.
 - 3. Fresh air supply systems.
 - 4. Mechanical exhaust systems.
 - 5. Air relief systems.
 - 6. Fume hood exhaust systems.
 - 7. Wood shop exhaust system.
- C. Specific Duct System Classifications:

<u>Service</u>	<u>Material</u>	<u>Pressure Class</u>	<u>Velocity</u>
HVAC Supply	Galvanized Steel	2" WG	2500 FPM
Return Relief Exhaust	Galvanized Steel	1" WG Negative	1500 FPM
Air Plenums	Galvanized Steel	2" WG	2500 FPM
Fume hood	Stainless Steel	4" WG Negative	4000 FPM
Woodshop	Galvanized Steel	5" WG Negative	3000 FPM

- D. External insulation for ductwork is specified in Division 15 insulation sections, and is not included as work of this section.
- E. Duct accessories are specified in Division 15 Section and are included as work of this section.
- F. Inlets and outlets are specified in Division 15 section and are included as work of this section.
- G. Duct lining, as specified herein and indicated on drawings, is included as work of this section.

1.02 SUBMITTALS

- A. Product data: Submit manufacturer's specifications on manufactured products and factory fabricated ductwork, used for work of this section.
- B. Shop drawings: Submit dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Duct dimensions shall be external and provide adequate space to include lining and maintain internal dimensions

indicated on contract drawings. When appropriate, show modifications of indicated requirements made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

- C. As-Built drawings: At project closeout, submit as-built drawings of installed ductwork, duct accessories, and outlets and inlets, in accordance with requirements of Division 1.

1.03 QUALITY ASSURANCE AND REQUIRED CODES AND STANDARDS

- A. SMACNA standards (metal and flexible ductwork) - comply with SMACNA "HVAC Duct Construction Standards" latest edition for fabrication and installation of metal and flexible ductwork.
- B. SMACNA standards (thermoplastic duct) - comply with SMACNA "Thermoplastic Duct (PVC) Construction Manual" latest edition for fabrication and installation of thermoplastic (PVC) ductwork.
- C. SMACNA standards (fibrous glass ductwork) - comply with SMACNA "Fibrous Glass Duct Construction Standards" latest edition for fabrication and installation of fibrous glass ductwork.
- D. SMACNA standards (industrial duct) - comply with SMACNA "Accepted Industry Practice for Industrial Duct Construction"; "Accepted Industry Practice for Round Industrial Duct Construction"; and "Accepted Industry Practice for Square Industrial Duct Construction", latest editions, for fabrication and installation of industrial ductwork.
- E. SMACNA standards: Comply with SMACNA "Duct Liner Standards" for installations of duct liner in sheet metal ductwork.
- F. NFPA compliance: Comply with NFPA 90 A "Standard for the Installation of Air Conditioning and Ventilating Systems."

1.04 DELIVERY, STORAGE AND HANDLING

- A. Protect shop fabricated and factory fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.
- B. Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with waterproof wrapping.

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

- A. Exposed ductwork materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, oil canning, stains and discolorations, and other imperfections, including those which would impair painting.

- B. Sheet metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ANSI/ASTM A 527, lockforming quality, with ANSI/ASTM A 525, G90 zinc coating, mill phosphatized for exposed locations.
- C. Flexible Duct - Polyethylene Vapor Barrier Type. Where indicated, provide insulated flexible duct as follows:
1. Galvanized steel helix, formed and mechanically locked to fabric.
 2. Aluminum foil trilaminate, fiberglass and aluminized polyester, mechanically locked (no adhesive).
 3. Exterior fiberglass insulation blanket factory wrapped. Thermal conductance, C factor, not more than 0.23.
 4. Outer jacket of gray fire retardant polyethylene material.
 5. UL listed per UL 181, Class 1 Air Duct.
 6. Operating temperature range -20 degrees to 250 degrees F.
 7. Flame spread less than 25, smoke developed less than 50.
 8. Working pressures:
 - a. 6 inch w.g. positive (all diameters).
 - b. 4 inch w.g. negative, through 16 inch diameters.
 - c. 1 inch w.g. negative, 18 to 20 inch diameters.
 9. Rated velocity: 4,000 FPM.
 10. Manufacturer:
 - a. Flexmaster, Type 3.
 - b. Clevaflex USA, Inc.
 - c. Thermaflex.
- D. Flexible Duct Fittings: Provide factory manufactured galvanized steel fittings. Use 45 degree laterals, ball mouth tees, spin collars, or conical tees for duct taps. 90 degree tees shall not be allowed.

2.02 DUCT LINER

- A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.
1. Manufacturers:
 - a. CertainTeed Corp.; Insulation Group.
 - b. Johns Manville International, Inc.
 - c. Knauf Fiber Glass GmbH.
 - d. Owens Corning.
 2. Materials: ASTM C 1071; surfaces exposed to air stream shall be coated to prevent erosion of glass fibers.
 - a. Thickness: 2 inches.
 - b. Thermal Conductivity (k-Value): 0.26 at 75°F (0.037 at 24°C) mean temperature.

- c. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
- d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
- e. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.
 - 1) Tensile Strength: Indefinitely sustain a 50-lb- (23-kg) tensile, dead-load test perpendicular to duct wall.
 - 2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch (3 mm) into air stream.
 - 3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

2.03 MISCELLANEOUS DUCTWORK MATERIALS

- A. General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.
- B. Duct sealant: Non-hardening, non-migrating mastic elastic sealant (type applicable for fabrication/installation detail) as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork. Liquid allowed for slip joints only. Silicone base duct sealer shall be used on duct joints exposed to weather.
- C. Ductwork support materials.
 - 1. For galvanized steel ductwork, provide hot dipped galvanized steel fasteners, anchors, rods, straps, trim and angles.
 - 2. For stainless steel ductwork, provide matching stainless steel support materials.
 - 3. For flexible ductwork, provide hot dipped galvanized steel support material.
- D. Duct Connector: Where duct system meets or exceeds pressure class of 2" w.g., positive or negative, incorporate the use of rolled, formed, machine manufactured duct connector.
 - 1. Manufacturer: Subject to compliance with requirements, provide duct connector of one of the following:
 - a. Ward.
 - b. Ductmate.
 - c. United McGill.
 - d. Flexmaster.

2.04 SHOP FABRICATION

- A. Shop fabricate ductwork in 4, 8, 10 or 12 foot lengths, unless otherwise indicated or required to complete runs. Pre-assemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for re-assembly and coordinated installation.
- B. Shop fabricate ductwork of gages and reinforcement complying with applicable SMACNA standard.
- C. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with inside radius equal to associated duct width. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers.
- D. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division 15 section "Duct Accessories" for accessory requirements.
- E. Fabricate ductwork with duct liner in each section of duct where indicated. Fabricate ductwork large enough to accept liner of thickness indicated and to maintain inside dimensions shown on contract drawings. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners.
- F. Provide lining in all ductwork that is conveying below ambient temperature air and is not insulated. Provide lining in supply air and return air ductwork from air handling unit to 20 feet away from the unit. Provide lining in ductwork as indicated on drawings.

2.05 FACTORY FABRICATED DUCTWORK

- A. General: At Installer's option, provide factory fabricated spiral, round or oval duct and fittings, in lieu of shop fabricated duct and fittings.
- B. Gauge: Tables 3-2 and 3-3 SMACNA "HVAC Duct Construction Standards." No standing rib shall be allowed.
- C. Oval Elbows: 3 gore 90 degree and 2 gore 45 degree with machine formed seam.
- D. Round Elbows: one piece construction for 90 degree and 45 degree elbows 14" and smaller. Provide 5 gore 90 degree and 3 gore 45 degree construction for larger diameter with machine formed seam joint.
- E. Divided flow fittings: 90 degree tees, constructed with saddle tap spot welded and bonded to duct fitting body.
- F. Manufacturer: subject to compliance with requirement, provide factory fabricated ductwork of one of the following:

1. United Sheet Metal Div., United McGill Corp.
2. Semco

PART 3 - EXECUTION

3.01 INSTALLATION OF DUCTWORK

- A. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (5% leakage) and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.
- B. Duct Sizing: Duct sizes indicated on drawings are inside dimensions.
- C. Flexible Duct: Flexible duct may be used for connecting room diffuser to sheet metal duct and/or ceiling terminal box only. Extend flexible duct completely and limit lengths to five feet (5'), or as indicated on Drawings. Support according to SMACNA.
- D. Seal ductwork to seal class as prescribed in SMACNA "HVAC Duct Construction Standards" for the static pressure classes indicated, unless otherwise recommended.
- E. Complete fabrication of work at project as necessary to match shop fabricated work and accommodate installation requirements.
- F. Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
- G. Electrical equipment spaces: Do not run ductwork through transformer vaults and their electrical equipment spaces and enclosures.

- H. Boiler Rooms: Do not run ductwork through boiler rooms unless protected per NFPA requirements.
- I. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus insulation with sheet metal flanges of same gage as duct. Overlap opening on four sides by at least 1-1/2".
- J. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- K. Support ductwork in manner complying with appropriate SMACNA standard.

3.02 INSTALLATION OF WOODSHOP EXHAUST (N/A)

3.03 APPLICATION OF LINER IN RECTANGULAR DUCTS

- A. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
- B. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
- C. Butt transverse joints without gaps and coat joint with adhesive.
- D. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
- E. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.
- F. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
- G. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
- H. Secure transversely oriented liner edges facing the airstream with metal nosing's that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - 1. Fan discharges.
 - 2. Intervals of lined duct preceding unlined duct.
 - 3. Upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm (12.7 m/s) or where indicated.

- I. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used; secure buildouts to duct walls with bolts, screws, rivets, or welds.

3.04 CLEANING AND PROTECTION

- A. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.
- B. Strip protective paper from stainless ductwork surfaces, and repair finish wherever it has been damaged.
- C. Temporary closure - at ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

3.04 BALANCING

- A. Refer to Division 15 Section 15990 "Testing, Adjusting and Balancing" for air distribution balancing of ductwork. Seal any leaks in ductwork that become apparent in balancing process.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15893 - DUCT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Extent of duct accessories work is indicated on drawings and in schedules, and by requirements of this section.
- B. Types of duct accessories required for project include the following:
 - 1. Fire and smoke dampers(in compliance with NFPA80-STD for opening protectives)
 - 2. Access doors
 - 3. Turning vanes
 - 4. Manual Dampers
 - a. Butterfly manual dampers
 - b. Opposed-blade manual dampers
 - 5. Intake/Exhaust dampers
 - 6. Flexible connections

1.02 SUBMITTALS

- A. Product data - submit manufacturer's specifications for each type of duct accessory, including dimensions, capacities, and materials of construction, and installation instructions.
- B. Shop drawings - submit assembly type shop drawings for each type of duct accessory showing interfacing requirements with ductwork, and method of fastening or support.
- C. Maintenance data - submit manufacturer's maintenance data including parts lists for each type of duct accessory, include this data in Maintenance Manual.

1.03 QUALITY ASSURANCE

- A. SMACNA compliance - comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) high pressure and low pressure duct construction standards.
- B. Industry standards - comply with American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of duct accessories, except as otherwise indicated.
- C. UL compliance - construct, test and label fire dampers in accordance with Underwriters Laboratories (UL) Standard 555 "Fire Dampers and Ceiling Dampers".

- D. NFPA compliance - comply with applicable provisions of ANSI/NFPA 90A "Air Conditioning and Ventilating Systems", pertaining to installation of duct accessories.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver components with factory installed packing and protective containers.
- B. Handle components carefully to prevent damage to components and finish. Do not install damaged components; replace with new.
- C. Protect components from weather, dirt, construction traffic and debris, etc.

PART 2 - PRODUCTS

2.01 FIRE AND SMOKE DAMPERS

- A. Standards, Fire and Smoke Dampers: Conform to the requirements of NFPA 90A and UL listed, labeled and rated 1-1/2 hours, and in compliance with NFPA80-STD for opening protectives. Provide fusible links 165 degrees F., vibration proof and secured with clinched "S" hooks or stainless steel bolts and lock nuts.
- B. Smoke Dampers: Conform to UL, fit with control shafts for operation by electric or pneumatic motors. Provide a 165 degrees F thermal link.
- C. Access Doors: Provide adjacent to all fire and smoke dampers.
- D. Manufacturer: Subject to compliance with requirements, provide products by one of the following.
 - 1. Ruskin Mfg. Co.
 - 2. Controlled Air, Inc.

2.02 ACCESS DOORS

- A. Standard: Conform to SMACNA.
- B. Location: Provide access doors in casings, plenums and ducts where shown on Drawings and where specified for ready access to operating parts including fire dampers, smoke dampers, valves, and concealed coils.
- C. Pressure Classification: Construct and install access doors in accordance with SMACNA Standards to suit the static pressure classifications and the locations where installed.
- D. Access Doors in Ducts: Provide and size doors as follows.
 - 1. Minimum 24-inch by 24-inch clear opening.
 - 2. When field conditions require an access opening smaller than 16-inch by 12-inch, provide a 24-inch long removable

section of casing or duct, secured with quick acting locking devices, 6 inches on centers, to permit ready access without dismantling other equipment.

- E. Door Requirements: Provide doors in casings and duct as follows.
 - 1. Arrange doors so that system air pressure will assist closure and prevent opening when the system is in operation.
 - 2. Coordinate doors and equipment to provide unrestricted passage through clear door opening, without removal of any equipment.
 - 3. Where pressure regulating dampers are installed in ducts or plenums, provide access doors with a clear wire glass observation port, 6-inch by 6-inch minimum size. Anchor port with structural metal frame, resilient gaskets and stainless steel bolts.
- F. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Ruskin Mfg. Co.
 - 2. Flexmaster USA, Inc.
 - 3. Ductmate Ind., Inc.
 - 4. United McGill Corp.

2.03 TURNING VANES

- A. Acoustic Turning Vanes: Construct of airfoil shaped aluminum extrusions with perforated faces and fiberglass fill.
- B. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
 - 1. Air Filter Corp.
 - 2. Anemostat Products Div., Dynamics Corp. of America.
 - 3. Duro-Dyne Corp.
 - 4. United McGill Corp.

2.04 MANUAL DAMPERS

- A. Provide dampers of single blade (butterfly) type, constructed in accordance with SMACNA Duct Standards.
- B. Provide dampers of multiple, opposed-blade type, constructed in accordance with SMACNA Duct Standards.
- C. Bearings: Two piece molded synthetic.
- D. Axles: 1/2" plated steel hew.
- E. Control Shaft: 1/2" diameter.
- F. Finish: Mill.

- G. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
1. Ruskin Mfg. Co.
 2. Controlled Air, Inc.
 3. United McGill Corp.

2.05 INTAKE OR EXHAUST DAMPERS

- A. General: Provide low leakage, airfoil dampers; opposed blade arrangement; AMCA rated 6 CFM/sq. ft. at 4" w.g.
- B. Construction
1. Frame: 6063T5 extruded aluminum hat channel 0.125 wall thickness 5" x 1" (5" x 1/2" top and bottom 12" high or less).
 2. Blades: 6" wide 6063T5 heavy gage extruded aluminum airfoil shape with extruded metal (aluminum) jam seals.
 3. Linkage: Concealed.
 4. Operators: Control operators specified under "Controls" Section, and is work of Division 15.
- C. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
1. Construction Specialties, Inc.
 2. Ruskin Mfg. Co.
 3. Arrow United Industries, Inc.

2.06 FLEXIBLE CONNECTIONS

- A. Fans: Provide flexible connections between fans and ducts or casings where indicated on the Drawings or required to accommodate expansion and vibration.
- B. Material: Construct connections of cotton duck, minimum 20 ounces per square yard.
- C. Elevated Temperature: For temperatures in excess of 100 degrees F., and corrosive, acid alkali or garage exhausts use close woven glass cloth, double neoprene coated, minimum 28 ounces per square yard.
- D. Length: Limit flexible connections to 4-inch active length in the direction of airflow.
- E. Standard: Construct in accordance with SMACNA Standards.
- F. Attachment: Attach to fans, casings and ductwork as specified by manufacturer.
- G. Manufacturer: Subject to compliance with requirements, provide products by one of the following manufacturers.
1. Vent Fabrics, Inc. or equal.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which duct accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install duct accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- B. Install turning vanes in square or rectangular 90 degree elbows in supply and exhaust air systems, and elsewhere as indicated.
- C. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.
- D. Coordinate with other work, including ductwork, as necessary to interface installation of duct accessories properly with other work.
- E. Field quality control - operate installed duct accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leakproof performance.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15895 - DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Scope: Extent of air diffuser and register work required in this Section is indicated on the Drawings and schedules and by the requirements of this Section.
- B. Types required for project include the following:
 - 1. Ceiling air diffusers.
 - 2. Wall and duct registers and grilles.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's standard technical product data including capacity ratings, throw, drop, diffusion, terminal velocities, noise levels, adjustability, construction details, finish and mounting details.
- B. Shop Drawings.
 - 1. Provide dimensioned shop drawings of linear diffuser mounting, plenum dimensions, plenum connections, damper connections and branch ductwork connections.
 - a. Draw shop drawings showing plans, sections, mounting details and finishes.
 - b. Furnish certified test data, including acoustical performance of the air troffer/boot combination with maximum air quantities indicated on the drawings.
- C. Schedule: Submit a schedule of proposed air diffusers, registers and grilles, keyed to the Contract Drawings and indicating the proposed type, size, air quantity, pressure drop and location of each device proposed under this Contract.
 - 1. Manufacturer: Same for all diffusers and registers on project.

1.03 QUALITY ASSURANCE

- A. ASHRAE: Test and rate air outlets and inlets in certified laboratories under the requirements of ASHRAE Standard 70.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Original Containers: Deliver air diffusers and registers to the site in manufacturer's original containers. Identify on outside of container type and location to be installed.

- B. Protect From Damage: Do not install bent, marred or damaged devices. Replace with new. Store indoors, where possible, or outdoors in weatherproof enclosures above grade.

PART 2 - PRODUCTS

2.01 AIR DIFFUSERS AND REGISTERS: GENERAL

- A. Construction: Provide devices as specified on drawings.
1. Treat steel with zinc phosphate or zinc chromate after fabrication.
 2. Grind, polish and factory prime.
 3. Factory finish with white baked enamel finish, unless otherwise indicated.
 4. Roll or reinforce exterior faces and edges.
 5. Ensure mitered joints and butt connections mate within 0.010-inch maximum crack.
 6. Surface finish: Smooth within 0.005-inch at welds, joints, clamping points and splices.
 7. Offsets and bends: Mitered.
 8. Mate devices with the associated duct, plenum or boot to form an airtight joint.
- B. Provide as scheduled on Drawings.

2.02 SUPPLY OR RETURN REGISTERS

- A. Register Type: Adjustable single or double-deflection type, formed steel or extruded aluminum, as indicated on the Drawings; noise levels of NC 20 or less.
- B. Bars: Provide adjustable or fixed face bars and fixed rear bars, as indicated by types on Drawings.
- C. Frames: Provide stamped or rolled steel or extruded aluminum frames fitted with felt, neoprene or plastic gaskets.
- D. Dampers: If indicated on drawings provide register dampers of formed steel, cadmium plated, gang key operated, opposed blade type, and arranged so that the operating mechanism does not project through any part of the register face.
- E. Mounting Hardware: Provide round or countersunk head Phillips screws.
- F. Air Extractors: Provide 18 gage frames, 22 gage curved steel blades, fixed pattern, screwed to the duct collar, and sized to match register dimensions.
- G. Manufacturer: Subject to compliance with requirements, provide registers of one of the following:
1. Titus Products.
 2. Anemostat Products Division, Dynamics Corp.
 3. Carnes Co., Division of Wehr Corp.

2.03 RETURN GRILLES

- A. Construction: Construct as specified for registers, except omit register damper.
- B. Bars: Provide fixed horizontal face bars with 1/2-inch spacing and 35 degree downward blade angle.
- C. Filters: If indicated on drawings provide 1-inch throw-away filters for return grilles.
- D. Manufacturer: Subject to compliance with requirements, provide grille units of one of the following:
 - 1. Titus Products.
 - 2. Anemostat Products Division, Dynamics Corp.
 - 3. Carnes Co., Division of Wehr Corp.

2.04 CEILING DIFFUSERS

- A. Ceiling Diffusers: Provide circular, square or rectangular, as indicated on the Drawings; noise levels as indicated on drawings.
- B. Diffuser Edge and Framing Details: Compatible with the type of ceilings in which the diffuser is installed. For plaster ceiling provide plaster frames or plaster rings, set flush with finished ceiling.
- C. Materials: Refer to drawings.
- D. Access: Provide removable internal parts of circular, square or rectangular diffusers, including volume regulators, diffuser face, dampers and equalizing devices.
 - 1. Allow removal of parts, including internal assembly, without the use of special tools.
 - 2. Do not allow removal of diffuser face to disturb the distribution pattern.
- E. Finish: Provide baked enamel finish on visible face. Coordinate color with Architect.
 - 1. Interior and concealed parts: Flat black or dark gray.
- F. Adjustable Pattern: Provide adjustable pattern diffuser cones to vary the distribution from horizontal parallel to the ceiling to a downward distribution pattern into the space, not on exposed face.
- G. Pressure Range: Design to allow equal distribution pattern, both horizontal and vertical, for diffusers with pressure drops from 0.10 to 0.40 inches water gage.
- H. Dampers, Diffusers, and Extractors: Products of the same manufacturer.

- I. Extractors: Provide adjustable extractors, furnished by the diffuser manufacturer, in each ceiling diffuser where indicated on drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Coordination: Coordinate the location of grilles, registers and diffusers with other trades. Examine areas and conditions under which inlets and outlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.
1. Examine architectural floor plans, reflected ceiling plans and elevations and arrange for duct taps to be so placed that the installation of air outlets will present a uniform relationship with architectural features, lighting, sprinkler heads, speakers and smoke detectors.
 2. On plain walls, if not otherwise indicated, locate sidewall registers approximately 8 inches down from the finished ceilings.
 3. Adjust the face and rear bars of supply registers to provide a diffusion pattern such that the terminal velocity point is approximately 70 percent of the "room" width and 5 to 6 feet above the finished floor, at a velocity of 20 to 50 fpm.
 4. On projects with reflected ceiling plans, locate outlets to conform to that plan.
 5. If no reflected ceiling plans are included in the Contract Documents, coordinate the location of air outlets with other trades before cutting in ceiling and sidewall taps. Provide coordination drawing in shop drawings.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15903 - AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL REQUIREMENTS.

1.01 GENERAL

- A. Furnish and install all temperature controls including all devices and accessories required for the installation of a complete Johnson web-based energy management and control system. All new controls shall be an extension of the existing Johnson Controls Facility Explorer DDC front-end. The existing FX-60/70/80 and FX Server will be expanded and upgraded, including all hardware, software, licenses, accessories as needed to accommodate all new controls and all sequences specified. The new equipment shall utilize the existing interface and shall be of comparable to the existing interface. Third party software or use of additional software to control the new equipment will not be acceptable. The ATC contractor will provide all network wiring between the FX60/70/80, and will provide all graphics, front-end programming to map up the new controls. The ATC contractor will include all additional licenses as necessary to accommodate the new controls.
- B. All new controls shall be of the DDC type unless specified otherwise. All DDC controls shall be manufactured by Johnson Controls. The design make for the web-based front-end controller and all local DDC controllers is Johnson Controls Facility Explorer.
- C. The ATC contractor shall be authorized by the system manufacturer and shall submit all training certificates and current proof that the ATC contractor is a Johnson Controls Authorized Systems Integrator - Gold (ASI-Gold).
- D. Under no circumstances, will the Owner accept bids for DDC systems that are proprietary in nature. If the bidding ATC contractor is including a DDC system other than Johnson FX, it must meet all of the requirements of this specification and the ATC contractor must list the DDC system in a substitutions list and include the following information with his bid:
 - 1. The name and address of the proposed ATC contractor and DDC system they are proposing.
 - 2. A list of at least two additional sources for the installation, service, and purchase of repair parts within a 50 mile radius of the School District. These sources must be completely independent from the proposed ATC contractor. The intent is to assure the District that they are not entering into a proprietary arrangement.
 - 3. Written assurance that the proposed substitute DDC system meets all of the requirements of this specification.
- E. Control systems shall be complete in all respects, including all labor, materials, equipment, and service necessary. The controls shall be of the DDC type unless otherwise specified.
- F. Control systems shall include, but not be limited to, all application specific controllers, transducers, transformers, cabinets, valves and operators, dampers and operators, relays, sensors, switches, and terminals.
- G. Control Systems shall be installed by competent mechanics regularly employed by a company whose primary business is the installation of automatic temperature control systems. The company must employ at

least ten control specialists who have successfully completed at least one Johnson factory-authorized training program on the controls specified for this project. The ATC contractor will be required to submit proof of such training in the form of a Johnson Controls Institute Certificate.

- H. Installation shall include all control components, installation of all control wiring and pneumatic tubing. All wiring required for interlocking and interfacing controls with the equipment to be controlled, whether low voltage or line voltage; calibration and adjustment of all controls, dampers, linkages, etc. is part of this contract.
- I. All control wiring concealed in walls or run in open areas of machine rooms shall be in conduit. In other locations, plenum rated cable shall be used.
- J. All pneumatic tubing, if any, shall be concealed in walls, run in open areas of machine rooms or in direct contact with uninsulated pipe shall be hard drawn copper tubing. Pneumatic tubing within control cabinets may be polyethylene. Tubing installed within areas (such as boiler rooms, mechanical rooms) or control panels that are subject to temperatures above 85°F, shall be rated for high temperature, and shall either be high temperature polyethylene, or copper tubing, as required above. Pneumatic fittings on control devices interfacing such high-temperature tubing shall be made of "non-conductive, high temperature material".
- K. The ATC Contractor shall provide (8) professionally bound submittal books showing how he proposes to complete the work specified herein. In this book, the ATC Contractor shall submit description of operation and schematic drawings, produced in AutoCAD, showing the wiring and pneumatic tubing of the entire control system to the District for review before starting any work. Bulletins describing each item of control equipment or component shall be included.
- L. Upon completion of his work, the ATC Contractor shall provide (8) professionally bound Operation & Maintenance Manuals showing exactly how each component of the system was installed, specifically noting any changes from the submittal book, and who authorized the change. Schematic drawings, sequences of operation and technical literature must be provided for all components of the system.
- M. All automatic temperature control work completed under this Contract shall be covered under a one (1) year warranty and service contract effective on date of acceptance. Scheduled maintenance service shall be provided to attend to the normal maintenance required for proper system operation in the building.
- N. It is the ATC Contractor's responsibility to inspect the buildings, their existing systems, and the project drawings to verify exact quantities of devices and controls required for the systems specified. No allowance will be made if the ATC Contractor fails to make such an examination.
- O. Provide nameplates on all devices, whether or not mounted on the face of the central and local control panels. In occupied areas, nameplates shall be concealed beneath covers of room type instruments, to describe functions.
- P. All control panels shall include wire markers for each wire, with an identifying wiring diagram.
- Q. The ATC Contractor shall provide a minimum of two (2) three-hour

training classes on the system operation and maintenance. This is to include both classroom and on-site training to ensure that the School District's custodial and maintenance personnel have adequate knowledge of the control system's features as well as operation and maintenance requirements. The ATC contractor will provide printed documentation to all persons attending the training sessions.

1.02 CONTROLLERS

- A. All room thermostats shall have covers with concealed adjustment. Thermostat or sensor locations not shown on the drawings shall be subject to approval of the Architect. All thermostats or sensors sensing temperature within ductwork or at coils are to be provided with elements of sufficient length to measure average temperature across the duct cross section or coil face. DDC space sensors shall have no local setpoint adjustment or override capability. It is the intent to make all adjustments through the existing front-end graphical software.

1.03 VALVES

- A. All automatic control 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 or closed position shall be as specified or as required to suit job conditions. Valves shall be capable of operating at varying rates of speed to correspond to the exact dictates of the controller and variable load requirements. Provisions shall be made for valves operating in sequence with other valves or damper operators to have adjustable operating ranges and starting points to provide flexibility of adjustment, sequencing, and throttling range.
- B. Automatic Control Valves shall be sized by the ATC Contractor and guaranteed to meet the heating or cooling requirements as specified, and as indicated on the drawings. Unless otherwise specified, control valves shall have 125 psig cast iron bodies with flanged connections on valves 2 1/2" or larger. Unless otherwise specified, valve bodies shall have the same pressure characteristics as the piping in which they are installed.
- C. No single valve, except zone valves, shall be larger than 2" in size. Where the capacity of equipment to be controlled requires a valve larger than 2", two (2) valves shall be installed in parallel with the smaller valve sized for a maximum of 1/3 of the total capacity.
- D. All control valves, unless otherwise noted, shall be of the globe valve type. Unless otherwise noted, **ball valves, irrespective of whether or not they have characterized discs, are not acceptable for control applications.**
- E. Actuators shall be electronic. They shall be mechanically fail-safe. **Capacitor-based fail-safe actuators are not acceptable.**

1.04 AUTOMATIC DAMPERS

- A. Automatic dampers shall be supplied and sized by the ATC Contractor to properly control the flow of air using methods similar to control valve sizing. The Sheet Metal Subcontractor shall provide required safing to fit the damper into the duct work. The dampers shall be constructed with galvanized blades and frames. Blades shall not exceed 6" in width and shall be provided with special replaceable

rubber seals on the blade edges and sides. Blades shall be formed from two spot-welded sheets for extra strength. Frames shall be channel shaped for strength, and to enclose linkage thus keeping linkage out of air stream.

- B. The entire construction shall be such that leakage does not exceed 10 cfm per square foot with 2" of static pressure across the damper.
- C. Dampers shall have opposed, or parallel blades as required by the application. The proper linkage shall be furnished to provide equal percentage or linear characteristics as required by the application.

1.05 CONTROL PANELS

- A. All control panels for this project will meet the following requirements **as a minimum**:
 - 1. The control panel shall be a fully enclosed cabinet, of baked enamel, steel or aluminum material construction and shall meet the requirements of NEMA 1 enclosures.
 - 2. The panel will have a hinged door with a locking latch.
 - 3. Each component on the front panel shall have an appropriate engraved nameplate fabricated from .062" or .125" thick phenolic material, with engraved permanent lettering. **Stick-on labels are not acceptable.**

1.06 DDC SYSTEM WIRING

- A. All conduit, wiring, accessories and wiring connections required for the installation of the Building Automation System, as herein specified, shall be provided by the ATC contractor unless specifically shown on the Electrical Drawings under Division 16 Electrical. The ATC contractor shall provide, install, and wire all repeaters, terminators as recommended by the BMS manufacturer.
- B. All wiring shall comply with the requirements of applicable portions of Division 16 and all local and national electric codes, unless specified otherwise in this section.
- C. All control wiring materials and installation methods shall comply with DDC system manufacturer's recommendations.
- D. The sizing, type and provision of cable, conduit, cable trays, and raceways shall be the design responsibility of the ATC contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, raceways and/or conduit by the ATC contractor, the ATC contractor shall be responsible for all costs incurred in replacing the selected components.

1.07 QUALITY ASSURANCE

- A. This project is an extensive installation of Johnson - Facility Explorer DDC controls within the District and in this building. The District must have assurance that the ATC contractor has full-time employees that are certified in the specified product line and has the resources within the ATC contractor's company to meet the requirements of this project, as well as interface with the existing Johnson DDC systems without voiding any current project warranties as a result of this project.
 - 1. As part of the BMS/controls submittal documentation, the ATC contractor is to supply the name and experience / qualifications of at least full-time ten employees the ATC

- contractor currently employs. These technicians should have at least five years' experience with the specified product line and in the automatic temperature control field. Employees of sub-contractors, suppliers or distributors are not eligible and shall not be counted in meeting this requirement.
2. The ATC contractor will also submit copies of factory-sponsored training certificates of at least ten employees certifying they have completed the manufacturer approved certification course on the specified Johnson Controls product line.
- B. The ATC contractor shall be authorized by the system manufacturer and shall submit training certificates and current proof that the ATC contractor is a Johnson Facility Explorer - Authorized Systems Integrator - Gold Certified (ASI-GOLD). If the bidding contractor wishes to use an ATC sub-contractor who is not a Johnson Controls FX-ASI-GOLD Contractor, the bidding contractor shall:
1. Provide a letter from the BMS manufacturer stating that the BMS manufacturer is fully supporting the proposed ATC sub-contractor and their technical capability for the duration of the project and the warranty period, and that the BMS manufacturer is undertaking liability in the event the ATC sub-contractor is unable to complete the project as specified or damages other components/functionality of the existing Johnson DDC BMS systems.
 2. As part of the BMS submittal and prior to commencing the project, the ATC sub-contractor will provide a time-stamped picture snapshot of each existing DDC graphic page on the BMS, as well as the system architecture of the entire network, recording the online/offline status and operating condition of each controller and I/O point on the BMS network. The ATC sub-contractor will create a digital library of these snapshots, labeling each picture with the unit tag and area served and submit this data in report form to the Engineer as part of the submittal documentation.
 3. Upon completion of the project and as part of the O&M documentation, the ATC sub-contractor will take a second time-stamped picture snapshot of each existing and new DDC equipment graphic page on the BMS, as well as the system architecture of the entire network, recording the online/offline status and operating condition of each controller and I/O point on the BMS network. The ATC sub-contractor will create a digital library of these snapshots, labeling each picture with the unit tag and area served, and submit this data in report form to the Engineer as part of the O&M documentation. Upon review and comparison of the system status and recorded snapshots at time of submittal and time of O&M, the Engineer will provide a punch-list to the Contractor for any differences between the two, deemed to have been caused as a result of the ATC sub-contractor's work on the system. The contractor will be required to rectify these deficiencies at no additional cost.
- C. The ATC contractor shall be an independent contractor whose primary business is the engineering, programming, installation/wiring and service of total integrated building management systems.
- D. The ATC Contractor shall have a fully staffed facility within a 50-mile radius of the project site supplying complete support and maintenance services available 24 hours-a-day, 7-days-a-week basis.
- E. All new DDC controllers shall be of the Johnson Controls Facility Explorer BACnet FX-PCG type. All controllers shall be non-proprietary and non-single source.

- F. Under no circumstances, will the Owner accept bids for DDC systems that are proprietary or single source in nature. If the bidding contractor is including a DDC system other than Johnson FX-60/70, it must meet all of the requirements of this specification and the contractor must list the DDC system in a substitutions list and include the following information with his bid:
1. The name and address of the proposed ATC sub-contractor and DDC system they are proposing.
 2. A list of at least two additional sources for the installation, service, and purchase of repair parts within a 50 mile radius of the School District. These sources must be completely independent from the proposed ATC sub-contractor. The intent is to assure the District that they are not entering into a proprietary arrangement
 3. Written assurance that the proposed substitute DDC system meets all of the requirements of this specification.

PART 2 -SEQUENCES OF OPERATION

2.01 EXISTING JOHNSON DDC FRONT-END

- A. Furnish and install all temperature controls including all devices and accessories required for the installation of a complete Johnson web-based energy management and control system.
1. There is an existing Johnson Controls FX front-end controller installed at this school. This contractor will furnish and install as many FX-80 controllers as required to accommodate all new equipment.
 2. This ATC contractor will furnish and install as many FX-80 controllers as required to accommodate all new equipment, and maintain a free Java heap of at least 10MB, with 25% spare capacity for future expansion.
 3. The ATC contractor for this project will modify the existing schedules, trends, and alarms to seamlessly integrate the points, schedules, alarms, and trends for the new controls. The ATC contractor will provide schedules for all equipment, zoned by different areas of the building as designated by the Owner. Providing a separate dedicated schedule for each piece of equipment is not acceptable unless specifically directed by the Owner.
 4. The ATC contractor for this project will be responsible for modifying the existing floorplans to provide a seamless, single graphical interface for both the new and existing controls. The ATC contractor will provide a 3-D floor plan of the entire building, with links to all DDC controlled equipment. Upon completion of this project, all DDC controlled equipment will be one seamless DDC front-end with graphical interface for each piece of equipment. Simply putting hyperlinks or data tables to represent the new controls is not acceptable.
 5. The ATC contractor will provide all network wiring and will provide all graphics, front-end programming to map up the new controls. The ATC contractor will include all additional licenses as necessary to accommodate the new controls.
 6. Override and offline Indication: All overridden points/setpoints will be displayed on the graphic in a purple color background, with white text. All points operating under normal control logic will be in black backgrounds with white or yellow text. All points that are offline will be indicated

in yellow background with black text.

7. Alarm Indication: Alarms shall be programmed to display on a customized graphical alarm screen indicating when any unit's supply fan command does not match the supply fan status. Low discharge temperature alarms shall also be indicated on the alarm screen if the discharge temperature of any unit drops below 45°F. An Alarm notification image will indicate on the home page and on every graphical page indicating an unacknowledged alarm condition. The flashing alarm notification will disappear once the user has acknowledged the alarm, but the alarm will remain in the alarm history database.
8. All DDC points indicated in the points list to be trended will be recorded at 1 hour intervals (or change of value).

2.02 NEW AIR HANDLING UNITS WITH COOLING

- A. A Johnson TE-6315P-1 discharge air sensor (8' averaging capillary), a Johnson TE-6315P-1 mixed air sensor (8' averaging capillary), TE-6314P-1 space temperature sensor and FX-PCG controller are to be installed for these units.
- B. Control valves will be replaced with new DDC actuated modulating globe type control valves by the ATC contractor.
- C. The ATC contractor shall supply and install all required controls to allow the following sequences of operation to occur.
- D. The DDC front-end will index the units between occupied and unoccupied cycles. The ATC contractor will provide and install a freeze-stat, wired to shut off the supply fan in all positions of the H-O-A switch. Manual reset of the freezestat is required. Freezestat status is to be monitored at the BMS front-end. As an added feature, the DDC controller will use the discharge air sensor to detect a potential freezing condition. The set point will be 5° higher than the set point of the freeze-stat. If such a condition occurs, the outside air damper shall close, the fans will shut down, the heating valve shall open, and an alarm generated at the DDC front-end. Whenever the unit's supply fan is off, the outside air damper shall be fully closed.
- E. Optimal Start: An adaptive optimal start algorithm shall be used to enable the unit with the outside air damper closed and heating valve open to warm-up the space prior to occupancy time, necessary to achieve zone occupied temperature setpoints by the start of scheduled occupied period. The learning adaptive algorithm shall compare the zone temperature to its setpoint at beginning of scheduled occupied period and shall automatically adapt the heating response time for the next unoccupied period. The maximum warm-up start time will be adjustable at the DDC front-end. At no later than the scheduled occupancy time, the unit will transition to occupied mode sequence as indicated below, with the outside air damper modulating open to minimum position to provide minimum required volumetric flow of outside air (adjustable).
- F. Occupied Cycle - Heating Mode: The supply fan will start and indicate to the DDC controller via a current relay wired to a binary input of the controller that the fan is running. Whenever the space temperature is below the space set point of 68°F (adjustable), the heating valve will be modulated to maintain the discharge air temperature at the discharge heating setpoint. The discharge air setpoint shall reset automatically between the discharge high limit of 100°F (adjustable) and low limit of 60°F (adjustable) reset based

on deviation of the space temperature from the space heating setpoint. As the space temperature rises above the space set point (adjustable), the outside air damper shall modulate open beyond their minimum position, up to 100% to maintain the cooling space setpoint. The controller's program will maintain a minimum discharge temperature of 60°F (adjustable) by modulating the outside air damper and heating valve, beyond the minimum position required volumetric flow rate of outside air, in sequence without overlap.

- G. Occupied Cycle - Cooling Mode (For units with mechanical cooling): When free cooling is not available, the unit will be indexed into cooling mode via the existing DDC front-end (based on outside air temperature) and shall operate in cooling mode as follows. During the occupied cycle, the unit's supply fan will run, and the dampers will be at their minimum position. The DDC controller shall cycle the stages of DX cooling to maintain the space temperature setpoint.
- H. Unoccupied Cycle. During the unoccupied cycle, the rooftop unit's supply fan shall be cycled, and heating valve opened to maintain space setback temperature set point. The outside air dampers shall be closed. No unoccupied operation shall occur during the cooling mode.
- I. All set points will be adjustable from the Johnson DDC System Front-end.
- J. All outside air dampers shall fail in the closed position.

2.03 Existing Gym Air Handler and Exhaust Fans F-4 and F-16:

- A. The air handler freeze-stat is to be left in place to shut the fan off when a freezing condition occurs. Whenever the fan is off, the outside air damper will be closed. As an added feature, the DDC controller will use the discharge air sensor to detect a potential freezing condition. The set point will be 5° higher than the set point of the factory freeze-stat. If such a condition occurs, an alarm will be displayed on the front-end. An email will be sent from the DDC front-end system to those recipients designated by the District. The alarm and email messages will indicate what caused the alarm and be stamped with the date and time that the alarm occurred. Whenever the unit is off, the outside air damper shall be fully closed.
 - 1. If outside air temperature is at or below 20F, adjustable, unit will enter occupied freeze protection mode and heating valve will maintain a minimum
- B. All setpoints will be adjustable from the BMS front-end
- C. The FX front-end will automatically switch the system between heating and economizer modes based on outdoor air temperature. The switchover set point will be adjustable via the BMS front-end.
- D. Occupied Mode - Heating: During the occupied period in heating mode, the air handler will run continuously, exhaust fan F-4 shall run continuously at its minimum speed via its VFD, and the locker room fan F-16 shall run continuously. Once the fans have been proven running by a current relay wired as a binary input to the DDC controller, the outside air damper shall open to its minimum position (adjustable from the BMS front-end). Whenever the space temperature is below the controller's occupied heating space set point, the heating valve modulates open. As the room temperature reaches the occupied heating space set point, the heating valve shall modulate closed. As the space temperature rises above the room set point, the outside air damper will modulate open and the exhaust fan F-4 rpm shall be increased to exhaust the additional outside air and maintain building pressure setpoint. The air handler discharge air

temperature shall be no lower than 60 deg F. The OA damper shall modulate between a maximum and minimum position configured in the BMS. The minimum position shall deliver 8,000 cfm of outdoor air and the maximum position shall deliver 11,000 cfm of OA. During the occupied period the OA damper shall not go below the min position.

- E. Unoccupied Mode - Heating: During unoccupied periods, the controller will cycle the air handlers supply fan to maintain a lower, unoccupied space set point. This set point shall initially be set at 60° but will be adjustable at the BMS front-end. The heating valve will be modulated to maintain the night heating setpoint. The outside air damper shall be fully closed during unoccupied mode. The exhaust fans shall be off.
- F. Unoccupied Mode - Cooling: No operation will occur during unoccupied periods while in cooling season. The air handler's supply fan will be off, cooling will be disabled, and the outside air damper shall be fully closed during unoccupied mode.
 - 1. All outside air dampers shall fail in the closed position.
 - 2. The heating control valve shall fail in the open position.
- G. All existing or new auxiliary finned tube radiation will be provided with a dedicated control signal from the DDC controller and will cycle a new auxiliary radiation control valve (provided by the ATC Contractor) to maintain the space setpoint. A lower set point will be maintained during the unoccupied cycle.

2.04 NEW CABINET HEATERS

- A. Based The units shall be controlled by a Johnson TE-6314P-1 room mounted sensors to maintain occupied and unoccupied space temperature set points.
- B. The units shall be tied into the building's Johnson FX DDC control system for occupied/unoccupied cycle operation. All setpoints will be adjustable from the FX front-end.
- C. Occupied Period: Whenever the space temperature is below the controller's set point, the fan will cycle on and the heating valve shall be fully open. When the room temperature reaches the space set point, the fan will cycle off and the heating valve shall be closed.
- D. During the unoccupied cycle the unit's supply fan and heating valve shall be cycled to maintain space setback temperature set point.

2.05 NEW UNIT VENTILATOR AND AUX FTR

- A. The units shall be controlled by Johnson TE-6314P-1 room mounted sensors to maintain occupied and unoccupied space temperature set points. A Johnson TE-6315P-1 discharge air sensor (8' averaging capillary), TE6314P-1 space temperature sensor and FX controller are to be installed for each unit.
- B. The units will be provided with a factory installed freeze-stat. This is to be left in place to shut the fan off when a freezing condition occurs. Whenever the fan is off, the outside air damper will be closed. As an added feature, the DDC controller will use the discharge air sensor to detect a potential freezing condition. The set point will be 5° higher than the set point of the factory freeze-stat. If such a condition occurs, the outside air damper will close, the face/bypass damper will fully face the coil and an alarm will be displayed on the front-end and an email will be sent from the DDC front-end system to those recipients designated by the District. The alarm and email messages will indicate which unit

caused the alarm and be stamped with the date and time that the alarm occurred.

- C. The units shall be tied into the building's Johnson FX DDC control system for occupied/unoccupied cycle operation. All setpoints will be adjustable from the FX front-end.
- D. Occupied Period: The fan will run continuously. Once the fan has been proven running by a current relay wired as a binary input to the DDC controller, the outside air damper shall open to its minimum position (adjustable). Whenever the space temperature is below the controller's set point, the face and bypass damper shall modulate towards the bypass position. As the space temperature rises above the room set point, the outside air damper will be modulated open. The discharge low limit control will modulate the face/bypass and outside air damper in sequence to maintain a discharge air temperature of 60°F (adjustable).
- E. During the unoccupied cycle, the unit's supply fan shall be cycled to maintain space setback temperature set point. The face/bypass damper will be modulated to maintain the night heating set point. The outside air dampers shall be closed.
- F. All outside air dampers shall fail in the closed position.
- G. For any new units that have existing or new auxiliary finned tube radiation, a dedicated control signal from the DDC controller will cycle a new auxiliary radiation control valve (provided by ATC contractor) to maintain the space set point. A lower set point will be maintained during the unoccupied cycle.
- H. For any new units that have a relief hood serving the same space as the unit ventilator, the relief hood damper will be modulated to parallel the position of the outside air damper of the respective unit.

2.06 NEW PTAC UNITS

- A. Based The units shall be controlled by a Johnson TE-6314P-1 room mounted sensors to maintain occupied and unoccupied space temperature set points.
- B. The units shall be tied into the building's Johnson FX DDC control system for occupied/unoccupied cycle operation. All setpoints will be adjustable from the FX front-end.
- C. Occupied Period: Whenever the space temperature is below the controller's set point, the fan will cycle on and the heating valve shall be fully open. When the room temperature reaches the space set point, the fan will cycle off and the heating valve shall be closed. During the unoccupied cycle the unit's supply fan and heating valve shall be cycled to maintain space setback temperature set point.
- D. Occupied Cycle - Heating Mode: The supply fan will start and indicate to the DDC controller via a current relay wired to a binary input of the controller that the fan is running. Whenever the space temperature is below the space set point of 68°F (adjustable), the heating valve will be modulated to maintain the discharge air temperature at the discharge heating setpoint. The discharge air setpoint shall reset automatically between the discharge high limit of 100°F (adjustable) and low limit of 60°F (adjustable) reset based on deviation of the space temperature from the space heating setpoint. As the space temperature rises above the space set point (adjustable), the outside air damper shall modulate open beyond their minimum position, up to 100% to maintain the cooling space setpoint. The controller's program

will maintain a minimum discharge temperature of 60°F (adjustable) by modulating the outside air damper and heating valve, beyond the minimum position required volumetric flow rate of outside air, in sequence without overlap.

- E. Occupied Cycle - Cooling Mode (For units with mechanical cooling): When free cooling is not available, the unit will be indexed into cooling mode via the existing DDC front-end (based on outside air temperature) and shall operate in cooling mode as follows. During the occupied cycle, the unit's supply fan will run, and the dampers will be at their minimum position. The DDC controller shall cycle the stages of DX cooling to maintain the space temperature setpoint.
- F. Unoccupied Cycle. During the unoccupied cycle, the rooftop unit's supply fan shall be cycled, and heating valve opened to maintain space setback temperature set point. The outside air dampers shall be closed. No unoccupied operation shall occur during the cooling mode.
- G. All set points will be adjustable from the Johnson DDC System Front-end.
- H. All outside air dampers shall fail in the closed position.

2.07 REHAB OF EXISTIG EXHAUST FANS & MOTORIZED DAMPERS

- A. This scope of work applies to all existing exhaust fans and dampers as noted on the plans.
- B. The following is intended to convey the spirit of the specification but does not limit the ATC contractor's responsibilities
 - a. All dampers are to be lubricated and adjusted for tight close off. Damaged or missing linkage is to be repaired or replaced. Defective actuators are to be repaired or replaced with new in kind.
 - b. The exhaust fans will be connected to the BMS system and will run during the occupied mode and remain off during the unoccupied mode based on a schedule in the front-end.
 - c. A signed sticker applied at the control device is required. The burden of proof that the control was looked at and proven functional is the ATC contractor's responsibility. Failure to apply stickers may be cause for redoing that system.

PART 3 - DYNAMIC COLOR GRAPHICS REQUIREMENTS

The color graphics that the user will see to operate the system shall be resident in the FX web-based front-end controller. PC-based systems are not acceptable. The main graphic shall be a three-dimensional floor plan of the building with links to each room and its HVAC system. The display will provide links to all DDC equipment in the building. Links to data trends and schedules shall be located on each system's graphic screen. The minimum point information that is to be mapped to the front-end panel and shown in the color graphic screens is as follows:

Air Handling Units				
Description	Point	History	Alarm	Totalize
Discharge Air Temperature	AI	X	X	
Space Temperature	AI	X	X	
Outside Air Temperature	AI	X		
Unoccupied Space Set Point	AV	X		
Occupied Space Set Point	AV	X		
Working Setpoint	AV	X		
Discharge Low Limit Set Point	AV	X		

Freezestat Status	BI	X	X	
Heating Valve	AO	X		
Cooling Command	BO	X	X	
Damper Command	AO	X		
Supply Fan Status	BI	X	X	X
Supply Fan Command	BO	X	X	
Minimum Outdoor Air Damper Position (adjustable)	AV	X		
Occupied Command	BV			
Occupied Status	BV	X		
Status of DDC controller	BV		X	

Cabinet Heaters				
Description	Point	History	Alarm	Totalize
Space Temperature	AI	X	X	
Unoccupied Space Set Point	AV	X		
Occupied Space Set Point	AV	X		
Working Setpoint	AV	X		
Heating Valve	BO	X		
Supply Fan Command	BO	X	X	
Occupied Command	BV			
Occupied Status	BV	X		
Status of DDC controller	BV		X	

Unit Ventilators				
Description	Point	History	Alarm	Totalize
Damper Command	AO	X		
Discharge Air Temperature	AI	X	X	
Discharge Low Limit Set Point	AV	X		
Heating Valve / Face & Bypass Damper	AO	X		
Auxiliary Radiation Valve	BO	X		
Minimum Outdoor Air Damper Position (adjustable)	AV	X		
Occupied Command	BV			
Occupied Space Set Point	AV	X		
Occupied Status	BV	X		
Outside Air Temperature	AI	X		
Space Temperature	AI	X	X	
Status of DDC controller	BV		X	
Supply Fan Command	BO	X	X	
Supply Fan Status	BI	X	X	X
Unoccupied Space Set Point	AV	X		
Working Setpoint	AV	X		
Motorized Dampers				
Relief Air Damper Command	BO	X		
Occupied Command	BV			
Occupied Status	BV	X		
Status of DDC controller	BV		X	

PART 4 - HISTORICAL DATA TRENDING REQUIREMENTS

All the points listed will be trended in the FX to record historical data for

a period of 7 days, trended once per hour. The District intends to track these data for improving efficiency and occupancy conditions.

PART 5 - HARDWARE REQUIREMENTS:

5.01 GENERAL DESCRIPTION:

- A. The Building Automation System (BAS) shall use an open architecture and where applicable support a multi-vendor environment. To accomplish this effectively, the BAS shall not be limited to a single open communication protocol standard, but to also integrate third-party devices and applications via additional protocol and through the latest software standards. The system configuration shall be available for use on the Internet, or intranets using off the shelf, industry standard technology compatible with other owner provided networks.
- B. The Building Automation System shall consist of the following:
 - a. DDC Controllers (HVAC, etc.)
 - b. Input, Output Modules
 - c. Local Display Devices
 - d. Portable Operator's Terminals - Portable PC's
 - e. Distributed User Interfaces
 - f. Network processing, data storage and communications equipment
 - g. Other components required for a complete and working BAS
- C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, controllers and operator devices, while re-using existing controls equipment.
- D. The system architectural design shall eliminate dependence upon any single device for alarm generation and control execution. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.
- E. Acceptable Systems
 - a. Facility Explorer by Johnson Controls
 - b. Others per addendum

5.02 BAS ARCHITECTURE - AUTOMATION NETWORK

- A. The automation network shall be configured as a Client/Server network with a web server operating on the Client's LAN/WAN. The web browser interface is extended over the LAN/WAN. Monitoring and control of the BAS is available using the web browser interface.
- B. The automation network shall include the option of a PC industry standard of Ethernet TCP/IP. Where used, LAN controller cards shall be standard "off the shelf" products available through normal PC vendor channels.
- C. The BAS shall network multiple user interface clients, system controllers and systems supervisors as required for systems operation.
- D. The automation network option shall be capable of operating at a communication speed of 100 Mbps.
- E. The automation network option will be compatible with other enterprise-wide networks. Where indicated, the automation network shall be connected to the enterprise network and share resources with it by way of standard networking devices and practices.

5.03 BAS ARCHITECTURE - CONTROL NETWORK

- A. Network Automation Controllers, LP-FX60, (NAC) shall provide management over the control network(s) and shall support the following communications protocols:
 - a. BACnet® Standard (ANSI/ASHRAE Standard 135-) MS/TP master.
 - b. LONWORKS® enabled devices using the free topology transceiver (FTT-1x). Johnson Controls® N2 Open.
 - c. Modbus RTU and Modbus TCP.
- B. The NAC shall be BTL (BACnet Testing Laboratories) listed as B-BC (BACnet Building Controller) and support the following data link options:
 - a. BACnet Internet Protocol (IP) (Annex J). BACnet IP (Annex J) Foreign.
 - b. ISO 8802-3, Ethernet (Clause 7).
- C. Control networks shall provide either "Peer-to-Peer," Master-Slave, or Supervised Token Passing communications, and shall operate at a minimum communication speed of 9600 baud.
- D. Digital Controllers shall reside on the control network.
- E. A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided for each controller device (master or slave) that will communicate on the BACnet MS/TP Bus.
- F. The PICS shall be submitted 10 days prior to bidding.

5.04 USER INTERFACE - BROWSER BASED INTERFACE

- A. The system shall be capable of supporting an unlimited number of clients using standard Web browser such as Internet Explorer™ or Mozilla Firefox™. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.
- B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the Building Automation System (BAS), shall not be acceptable.
- C. The Web browser client shall support at a minimum, the following functions:
 - 1. User log-on identification and password shall be required. If an unauthorized user attempts access, notice of access failure shall be displayed. Security using authentication and encryption techniques to prevent unauthorized access shall be implemented.
 - 2. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
 - 3. Storage of the graphical screens shall be in the Network Automation Controller (NAC) or the server, without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
 - 4. Real-time values displayed on a Web page shall update automatically without requiring a manual "refresh" of the Web page.
 - 5. Users shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:
 - 6. Modify common application objects, such as schedules and setpoints in a graphical manner.
 - 7. Commands binary objects to start and stop.
 - 8. View logs and charts.
 - 9. View alarms.
- D. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by

specifying the Uniform Resource Locator (URL) for the desired link.

5.05 USER INTERFACE - ALARMS

- A. Alarm feature shall allow user configuration of criteria to create, route, and manage alarms and events. It shall be possible for specific alarms from specific points to be routed to specific alarm recipients. The alarm management portion of the user interface shall, at the minimum, provide the following functions:
 - 1. Allow configuration to generate alarms on any numeric, binary, or data point in the system.
 - 2. Generate alarm records that contain a minimum of a timestamp, original state, acknowledged state, alarm class and priority.
 - 3. Allow the establishment of alarm classes that provide the routing of alarms with similar characteristics to common recipients.
 - 4. Allow a user, with the appropriate security level, to manage alarms - including sorting, acknowledging, and tagging alarms.

5.06 USER INTERFACE - REPORTS AND SUMMARIES

- A. Reports and Summaries shall be generated and directed to the user interface displays, with subsequent assignment to printers, or disk. As a minimum, the system shall provide the following reports:
 - 1. All points in the BAS
 - 2. All points in each BAS application
 - 3. All points in a specific controller
 - 4. All points in a user-defined group of points
 - 5. All points currently in alarm
 - 6. All BAS schedules
 - 7. All user defined and adjustable variables, schedules, interlocks and the like
- B. Reports shall be exportable to .pdf, .txt, or .csv formats.
- C. The system shall allow for the creation of custom reports and queries.

5.07 USER INTERFACE - SCHEDULES

- A. A graphical display for time-of-day scheduling and override scheduling of building operations shall be provided. At a minimum, the following functions shall be provided:
 - 1. Regular schedules
 - 2. Repeating schedules
 - 3. Exception Schedules
- B. Weekly schedules shall be provided for each group of equipment with a specific time use schedule.
- C. It shall be possible to define one or more exception schedules for each schedule including references to calendars.
- D. Monthly calendars shall be provided that allow for simplified scheduling of holidays and special days. Holidays and special days shall be user-selected with the pointing device or keyboard.

5.08 USER INTERFACE - PASSWORDS

- A. Multiple-level password access protection shall be provided to allow the system manager to assign user interface control, display, and database manipulation capabilities deemed appropriate for each user based on an assigned password.
- B. Each user shall have the following: a username, a password, and access levels.
- C. The system shall provide the capability to require a password of minimum length and require a combination of characters and numerical

- or special characters.
- D. When entering or editing passwords, the system shall not echo the actual characters for display on the monitor.
- E. The system shall provide unlimited flexibility with access rights. A minimum of four levels of access shall be provided along with the ability to customize the system to provide additional levels.
- F. A minimum of 100 unique passwords shall be supported.
- G. Operators shall be able to perform only those commands available for their respective passwords. Display of menu selections shall be limited to only those items defined for the access level of the password used to log-on.
- H. The system shall automatically generate a report of log-on/log-off and system activity for each user.
- I. All log data shall be available in .pdf, .txt, and .csv formats.

5.09 USER INTERFACE - DYNAMIC COLOR GRAPHICS

- A. The graphics application program shall be supplied as an integral part of the User Interface.
- B. The graphics applications shall include a create/edit function and a runtime function. The system architecture shall support an unlimited number of graphics documents (graphic definition files) to be generated and executed.
- C. The graphics shall be able to display real-time data that is acquired, derived, or entered.
- D. Graphics runtime functions -Each graphic application shall be capable of the following functions:
- E. All graphics shall be fully scalable
- F. The graphics shall support a maintained aspect ratio.
- G. Multiple fonts shall be supported.
- H. Unique background shall be assignable on a per graphic basis.
- I. Operation from graphics - It shall be possible to change values (setpoints) and states in systems controlled equipment within the Web browser interface.
- J. Graphic editing tool - A graphic editing tool shall be provided that allows for the creation and editing of graphic files. The graphic editor shall be capable of performing/defining all runtime binding.

5.10 HISTORICAL DATA COLLECTION

- A. All numeric, binary or data points in the system database shall allow their values to be logged over time (trend log). Each historical record shall include the point's name, a time stamp including time zone, and the point's value.
- B. The configuration of the historical data collection shall allow for recording data based on change of value or on a user-defined time interval.
- C. The configuration of the historical data collection shall allow for the collection process to stop or rollover when capacity has been reached.
- D. A historical data viewing utility shall be provided with access to all history records. This utility shall allow historical data to be viewed in a table or chart format.
- E. The history data table view shall allow the user to hide/show columns and to filter data based on time and date. The history data table shall allow exporting to .txt, .csv, or .pdf file formats.
- F. The historical data chart view shall allow different point histories to be displayed simultaneously, and also provide panning and zooming capabilities.

5.11 AUDIT LOG

- A. For each log entry, provide the following data;
 - 1. Time and date
 - 2. User ID
 - 3. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

5.12 NETWORK AUTOMATION CONTROLLER (NAC) - FX80

The NAC must provide the following hardware features as a minimum:

- A. Communications
 - 1. Two 10/100 Mb Ethernet Port - RJ-45 connections
 - 2. One RS-485 port (up to 57,600 baud)
 - 3. Expandable communications ports including LON, RS485, Modem, Wireless Terminal Equipment Control
 - 4. All required protocol drivers as required by the sequence of operation.
- B. Battery Backup: Battery backup provided for all on board functions including I/O
 - 1. Battery is monitored and trickle charged
 - 2. Battery maintains processor operation through power failures for a pre-determined interval, and then writes all data to flash memory, shuts the processor down, and maintains the clock for three months.
 - 3. Environment Must be capable of operation over a temperature range of 32 °F to 122 °F.
 - 4. Must be capable of withstanding storage temperatures of between 32 °F to 140 °F.
 - 5. Must be capable of operation over a humidity range of 5% to 95% RH, non-condensing
- C. The Network Automation Controller (NAC) shall be a fully user-programmable device capable of providing all of the capability described in Section 2.3 Part A.
- D. Automation network - The Network Automation Controller (NAC) shall reside on the automation network. Each NAC shall support one or more sub-networks of controllers.
- E. The Network Automation Controller shall have the capability to communicate directly with Modbus without the use of an additional gateway.
- F. The Network Automation Controller shall have the capability to provide secure communications via SSL (Secure Socket Layer).
- G. User Interface - Each Network Automation Controller (NAC) shall have the ability to deliver a web based user interface as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.
- H. Power Failure - In the event of the loss of normal power, The Network Automation Controller (NAC) shall continue to operate for a defined period after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software. Flash memory shall be incorporated for all critical controller configuration data.
- I. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions.
- J. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.
- K. Certification - All controllers shall be listed by Underwriters Laboratories (UL).

5.13 INPUT DEVICE CHARACTERISTICS General Requirements: Installation, testing, and calibration of all sensors, transmitters, and other input devices shall be provided to meet the system requirements.

- A. Temperature Sensors: Sensors and transmitters shall be provided, as outlined in the input/output summary and sequence of operations. The temperature sensor shall be of the resistance type and shall be either two-wire 1000 ohm nickel RTD, or two-wire 1000 ohm platinum RTD.
- B. Room Temperature Sensors: Room sensors shall be constructed for either surface or wall box mounting.
- C. Thermo wells: When thermo wells are required, the sensor and well shall be supplied as a complete assembly, including wellhead and Greenfield fitting. Thermo wells shall be pressure rated and constructed in accordance with the system working pressure. Thermo wells and sensors shall be mounted in a threadolet or ½-inch NFT saddle and allow easy access to the sensor for repair or replacement. Thermo wells shall be constructed of 316 stainless steel.
- D. Outside Air Sensors: Outside air sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall also be provided with a solar shield. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate that surrounds the sensor element. Temperature transmitters shall be of NEMA 3R construction and rated for ambient temperatures.
- E. Control Relays: Control pilot relays shall be of a modular plug-in design with retaining springs or clips. Mounting bases shall be snap-mount. DPDT, 3PDT, or 4PDT relays shall be provided as appropriate for application. Contacts shall be rated for 10 amps at 120 VAC. Relays shall have an integral indicator light and check button. Acceptable manufacturers: Idec, Functional Devices
- F. Electronic/Pneumatic Transducers: Electronic to Pneumatic transducers shall provide: Output: 3-15 psig,
- G. Input: 4-20 mA or 0-10 VDC, manual output adjustment, pressure gauge external replaceable supply air filter. Acceptable manufacturers: Johnson Controls, Mamac

5.14 APPLICATION SPECIFIC CONTROLLERS

- A. Each FX-60 supervisory panel shall be able to extend its monitoring and control through the use of standalone Application Specific Controllers (ASCs).
- B. Each ASC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.
- C. Each ASC shall have sufficient memory to support its own operating system and data bases including:
 - 1. Control Processes
 - 2. Energy Management Applications
 - 3. Operator I/O (Portable Service Terminal)
- D. The operator interface to any ASC point data or programs shall be through the FX-80 supervisory panel or portable operator's terminal connected to the ASC on the network.
- E. ASCs shall directly support the temporary use of a portable service terminal that can be connected to the ASC via zone temperature or directly at the controller. The capabilities of the portable service terminal shall include, but not be limited to, the following:
 - 1. Display temperatures
 - 2. Display status

3. Display set points
4. Display control parameters
5. Override binary output control
6. Override analog set points
7. Modification of gain and offset constants

(END OF SECTION)

DIVISION 15 - MECHANICAL

SECTION 15990 - HVAC TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Scope: Extent of HVAC testing, adjusting and balancing work required by this Section is indicated on the drawings, in schedules, and by the requirements of this Section.
- B. Testing, Adjusting and Balancing (TAB) contractor to meet or exceed all uniform code testing requirements. (e.g. ASHRAE, ASME, IMC, Etc.)
- C. Systems: Testing, adjusting and balancing specified in this Section includes the following systems:
 - 1. Air systems including supply, return and exhaust.
 - 2. Hydronic systems including heating, chilled water.
- D. Related Sections: Refer to other Division 15 sections for:
 - 1. Fans
 - 2. Air Terminal Units
 - 3. Pumps
 - 4. Hydronic Piping Systems
 - 5. Ductwork
 - 6. Boilers
 - 7. Chillers and Cooling Towers

1.02 QUALITY ASSURANCE

- A. Agency Qualifications
 - 1. The qualifications of the TAB contracting firms shall be submitted, within 30 days of notice to proceed. Recent projects shall be listed and described for the company. Names and telephone numbers of the project contractors and facility managers will be provided.
 - 2. The Owner must approve in writing the qualifications of both the company and the lead technician.
 - 3. Qualifications of TAB Firm Personnel:
 - 1. A minimum of one professional engineer with current registration is required to be in the permanent employment of the firm for supervision and direction in the work performed. This engineer shall be totally responsible for developing job site data as required for test procedures.
 - 2. All personnel used on job site shall be either professional engineer or technicians, who shall have been permanent, full-time employees of firm for a

minimum of six (6) months prior to start of work for that specified project.

3. The qualifications of the TAB lead site technician who will remain on site during all TAB work, within 30 days of notice to proceed. Recent projects shall be listed and described for the company. Names and telephone numbers of the project contractors and facility managers will be provided.
 4. The Owner must approve in writing the qualifications of both the company and the lead technician.
- B. Tester's Qualifications: A specialist certified by the National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC) with at least 3 years of experience in those testing, adjusting and balancing requirements similar to those required for this project, who is not the installer of the system to be tested and is otherwise independent of the project.
- C. Codes and Standards: Provide testing, adjusting and balancing conforming to American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), American National Standards Institute (ANSI), and either NEBB or AABC the following:
1. American National Standards Institute (ANSI): Comply with the following:
 - a. S1.4 Specification For Sound Level Meters
 - b. S1.11 Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters
 2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): Comply with ASHRAE recommendations pertaining to measurements, instruments, and testing, adjusting, and balancing.
 3. NEBB or AABC: Comply with NEBB'S "Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems" or comply with AABC MN-1 "National Standards," as applicable to mechanical air and hydronic distribution systems, and associated equipment and apparatus.
- D. Calibration of Testing Instruments: All measurement instruments used for testing, adjusting, balancing, and commissioning shall be calibrated. The time between the most recent calibration data and the final test report date shall not be over 1 year.

1.03 SUBMITTALS

- A. Test Reports: Provide certified test reports, signed by the test and balance supervisor who performed the work. The final reports shall include identification and types of instruments used, and their most recent calibration date and calibration date.

- B. Standards: Deliver a copy of either NEBB or AABC standards for testing and balancing work associated with the project. This document shall serve as specific guidance to balancers as to minimum requirements.
- C. Maintenance Data: Include, in maintenance manuals, copies of balance test reports and identification of instruments.
- D. Qualifications: Submit the individual qualifications of all persons responsible for supervising and performing the actual work.

1.04 AGENDA

- A. Agenda: A preliminary report and agenda shall be submitted and approved prior to the start of testing and balancing work.
 - 1. Review Drawings and Specifications prior to installation of any of the affected systems, and submit a report indicating any deficiencies in the systems that would preclude the proper adjusting, balancing, and testing of the systems.
 - 2. The agenda shall include a general description of each air and water system with its associated equipment and operation cycles for heating, intermediate, and cooling.
 - 3. The agenda shall include a list of all air and water flow and air terminal measurements to be performed.
 - 4. The agenda shall incorporate the proposed selection points for sound measurements, including typical spaces as well as sound sensitive areas.
 - 5. The agenda shall also include specific test procedures and parameters for determining specified quantities (e.g. flow, drafts, sound levels) from the actual field measurements to establish compliance with contract requirements. Samples of forms showing application of procedures and calculations to typical systems shall be submitted.
 - 6. Specific test procedures for measuring air quantities at terminals shall specify type of instrument to be used, method of instrument application (by sketch) and factors for:
 - a. Air terminal configuration.
 - b. Flow direction (supply or exhaust).
 - c. Velocity corrections.
 - d. Effective area applicable to each size and type of air terminal.
 - e. Density corrections.
 - 7. The agenda shall include identification and types of measurement instruments to be used, and their most recent calibration date and calibration date.

1.05 JOB CONDITIONS

- A. General: Do not proceed with testing, adjusting and balancing work until the following conditions have been met.
 - 1. Work has been completed and is operable. Ensure that there is no latent residual work yet to be completed on the tested equipment.
 - 2. Work scheduled for testing, adjusting and balancing is clean and free from debris, dirt and discarded building materials.
 - 3. All architectural openings (doors, windows, and other openings) which may affect the operation of the system to be tested, adjusted, and balanced shall at their normal states.
 - 4. All related mechanical systems which may affect the operation of the system to be tested, adjusted, and balanced shall be at their normal operating conditions. Coordinate tests with Controls Contractor.
 - 5. Air handling unit filters are not "loaded"; Mechanical Contractor shall replace, if required, prior to balancing.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

- A. Material: Seal, patch and repair ductwork, piping and equipment drilled or cut for testing purposes.
 - 1. Plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.
 - 2. Piping shall be capped with materials the same as the piping system.
 - 3. Insulation shall be neatly hemmed with metal or plastic

2.02 TEST INSTRUMENTS

- A. Standards: Utilize instruments and equipment of type, precision, and capacity as recommended in the following standards:
 - 1. NEBB "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
 - 2. AABC Manual MN-1, "AABC National Standards".
- B. Test Instruments: All instruments used for measurements shall be accurate and calibration histories for each instrument shall be available for examination. Each test instrument shall be calibrated by an approved laboratory or by the manufacturer. Owner's representative has the right to request instrument recalibration, or the use of other instruments and test methodology, where accuracy of readings is questionable.

- C. Additional Instruments: Permanently installed measuring instruments , such as temperature and pressure gauges, shall be checked against transfer standard instruments. Any instrument which does not meet specification requirement shall be replaced or recalibrated.
- D. Cone Instruments: Employ manufactured enclosure type cones, capable of air volume direct readings, for all diffuser air flow measurements. The readout meters shall meet calibration requirements.

PART 3 - EXECUTION

3.01 PROCEDURES AND INSTRUMENTS, GENERAL

- A. Requirements: All systems and components thereof shall be adjusted to perform as required by drawings and specifications.
- B. Test Duration: Operating tests of heating and cooling coils, fans, and other equipment shall be of not less than four hours duration after stabilized operating conditions have been established. Capacities shall be based on temperatures and air and water quantities measured during such tests.
- C. Instrumentation: Method of application of instrumentation shall be in accordance with the approved agenda.
 - 1. All instruments shall be applied in accordance with the manufacturer's certified instructions.
 - 2. All labor, instruments, and appliances required shall be furnished by the balancer. Permanently installed instruments used for the tests (e.g., flow meters and Btu meters) shall not be installed until the entire system has been cleaned and ready for operation.

3.02 AIR SYSTEM PROCEDURES

- A. Adjustments: Adjust all air handling systems to provide approximate design air quantity to or through, each component, and to maintain stable and comfortable interior temperatures, free of drafts or stagnant conditions. Adjusting and balancing of all systems shall be conducted during periods of the year approximating maximum seasonal operation. Verify operating parameters prior to start of balancing. Laboratory doors shall be closed and fume hood sashes full open, and all other ancillary systems in simultaneous operation. Coordinate with automatic control system operation.
- B. Balance: Flow adjusting (volume control) devices shall be used to balance air quantities (i.e., proportion flow between various terminals comprising system) to the extent that their adjustments do not create objectionable air motion or sound (i.e., in excess of specified limits).

1. Balancing between runs (submains, branch mains, and branches) generally shall be accomplished by flow regulating devices at, or in, the divided-flow fitting.
 2. Restriction imposed by flow regulating devices in or at terminals shall be minimal. Final measurements of air quality shall be made after the air terminal has been adjusted to provide the optimum air patterns of diffusion.
- C. Fan Adjustment: Total air system quantities, generally, shall be varied by adjustment of fan speeds or axial-flow fan wheel blade pitch. Damper restriction of a system's total flow may be used only for systems with direct-connected fans (without adjustable pitch blades), provided system pressure is less than 1/2-inch W.G. and sound level criteria is met.
- D. Air Measurement: Where air quantity measuring devices are specified in other sections such systems shall be used as a cross-check of portable measuring equipment.
1. Except as specifically indicated herein, pitot tube traverses shall be made of each duct to measure air flow therein. Pitot tubes, associated instruments, traverses, and techniques shall conform to the ASHRAE "Handbook Fundamentals Inch Pound Edition."
 2. For ducts serving modular office areas with movable partitions, which are subject to change, pitot tube traverses may be omitted provided the duct serves only a single room or space and its design volume is less than 2000 cfm. In lieu of pitot tube traverses, air flow in the duct shall be determined by totalling volume of individual terminals served, measured as described herein.
 3. Where duct's design velocity and air quantity are both less than 1000 (fpm/cfm), air quantity may be determined by measurements at terminals served.
- E. Test Holes: Test holes shall be in a straight duct, as far as possible downstream from elbows, bends, take-offs, and other turbulence generating devices, to optimize reliability of flow measurements.
- F. Air Terminal Balancing: Generally, measurement of flow rates by means of velocity meters applied to individual terminals, with or without cones or other adapters, shall be used only for balancing. Measurement of air quantities at each type of air terminal (inlet and outlet) shall be determined by the method approved for the balancing agenda.
- G. Air Motion: Air motion and distribution shall be as specified and indicated on Drawings.

3.03 WATER SYSTEM PROCEDURES

- A. Adjustment: All heating, cooling and condensing water systems shall be adjusted to provide required quantity to or through each

component. Verify operating parameters prior to start of balancing.

- B. Metering: Water quantities and pressures shall be measured with calibrated meters.
 - 1. Venturi tubes, orifices, or other metering fittings and pressure gauges shall be used to measure water flow rates and balance systems. Systems shall be adjusted to provide the approved pressure drops through the heat transfer equipment (coils [except room units], converters, etc.) prior to the capacity testing.
 - 2. Where flow metering fittings are not installed, in air/water type heat transfer equipment, flow balance shall be determined by measuring the air side energy differential across the heat transfer equipment. Measurement of water temperature differential shall be performed with the air system, adjusted as described herein, in operation.
- C. Automatic Controls: Automatic control valves shall be positioned for full flow through the heat transfer equipment of the system during tests.
- D. Flow: Flow through bypass circuits at three-way valves shall be adjusted to equal that through the supply circuit, when the valve is in the bypass position.
- E. Distribution: Adjustment of distribution shall be effected by means of balancing devices (cocks, valves, and fittings) and automatic flow control valves as provided; service valves shall not be used.
 - 1. Where automatic flow control valves are utilized in lieu of Venturi tubes, only pressure differential need be recorded, provided that the pressure is at least the minimum applicable to the tag rating.
- F. Special Procedures: Where available pump capacity (as designed) is less than total flow requirements of individual heat transfer units of system served, full flow may be simulated by the temporary restriction of flow to portions of the system; specific procedures shall be delineated in the agenda.

3.04 HEAT EXCHANGER CAPACITY VERIFICATION

- A. Air coil capacities shall be verified from air side measurement data. Capacities of coils shall be the difference of the energy carried by the air between the up stream and down stream of the coils.
- B. The measured air flow rate for the fan may be used for air coil capacity calculations providing no ducted bypassing of coil is occurring.
- C. Capacity verifications shall be performed after air and water systems have been balanced. Heat exchangers using steam as the

exchange medium shall have the steam measured and adjusted to the specified pressure.

- D. False load shall be applied if the upstream air or water does not meet the specified conditions at the time of test.

3.05 REPORTS

- A. Submittals: Three copies of the reports described herein, covering air and water system performance, air motion (fpm), and sound pressure levels, shall be submitted prior to final tests and inspection.
- B. Instrument Records: Types, serial numbers, and dates of calibration of all instruments shall be included.
- C. Reports: Reports shall conspicuously identify items not conforming to contract requirements, or obvious malfunction and deficiencies.

3.06 AIR SYSTEM DATA

- A. Report: The report shall include for each air handling system the data listed below.

- 1. Equipment (Fan or Factory Fabricated Station Unit):

- a. Installation data

- 1. Manufacturer and model
 - 2. Size
 - 3. Arrangement, discharge and class
 - 4. Motor hp, voltage, phase, cycles, and full load amps
 - 5. Location and local identification data

- b. Design data

- 1. Data listed in schedules on drawings and specifications.

- c. Fan recorded (test) data

- 1. cfm
 - 2. Static pressure
 - 3. rpm
 - 4. Motor operating amps motor operating bhp

- 2. Duct Systems:

- a. Duct air quantities (maximum and minimum) - main, submains, branches, outdoor (outside) air, total air, and exhaust

- 1. Duct size(s)
 - 2. Number of Pitot tube (pressure measurements)

3. Sum of velocity measurements (Note: Do not add pressure measurements)
 4. Average velocity
 5. Recorded (test) cfm design cfm
- b. Individual air terminals
1. Terminal identification supply or exhaust, location and number designation
 2. Type size, manufacturer and catalog identification applicable factor for application, velocity, area, etc., and designated area
 3. Design and recorded velocities- fpm (state "core," "inlet," etc., as applicable)
 4. Design and recorded quantities -cfm deflector vane or diffusion cone settings

3.07 WATER SYSTEM DATA

A. Report: The certified report for each water system shall include the data listed below.

1. Pumps:

a. Installation data

1. Manufacturer and model
2. Size
3. Type drive
4. Motor hp, voltage, phase, and full load amps

b. Design data

1. gpm
2. Head
3. rpm, bhp, and amps

c. Recorded data

1. Discharge pressures (full-flow and no-flow)
2. Suction pressures (full-flow and no-flow) operating head
3. Operating gpm (from pump curves if metering is not provided) no-load amps (where possible)
4. Full-flow amps
5. No-flow amps

2. Air Heating and Cooling Equipment:

a. Design data

1. Load in Btu or MBh
2. gpm

3. Entering and leaving water temperature
4. Entering and leaving air conditions (DB and WB)
- b. Recorded data
 1. Type of equipment and identification (location or number designation)
 2. Entering and leaving air conditions (DB and WB)
 3. Entering and leaving water temperatures
3. Water Chilling Units:
 - a. Installation data
 1. Manufacturer and model
 2. Motor hp, voltage, cycles, phase, and full load amps
 3. Part load amperes
 4. gpm - chiller and condenser
 5. Water pressure drop - chiller and condenser
 6. Entering and leaving water temperature - chiller and condenser
 - b. Recorded data (chiller and condenser)
 1. gpm
 2. Water pressure drop
 3. Entering and leaving water temperature
 4. Amperes

3.08 FINAL COMMISSIONING TESTS, INSPECTIONS AND ACCEPTANCE

- A. Scope: Test shall be made to demonstrate that capacities and performance of air and water systems comply with contract requirements.
 1. At the time of final inspection, recheck random selection of data (water and air quantities, air motion, and sound levels) recorded in the balancing report. All laboratories shall be rechecked for satisfactory air flow and motion on vicinity of and through hoods.
 2. Points and areas for recheck shall be selected by the Owner's Representative.
 3. Measurement and test procedures shall be the same as approved for work forming basis of certified report.
 4. Selections for recheck (specific plus random), in general, will not exceed 25 percent of the total number tabulated in the report, except that special air systems may require a complete recheck for safety reasons.
- B. Retests: If random tests elicit a measured flow deviation of 10 percent or more from, or a sound level of 2 db or more greater than, that recorded in the report listings, as 10 percent or more of the rechecked selections, the report shall be automatically

rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, new certified reports submitted, and new inspection tests made, all at no additional cost.

- C. Marking of Settings: Following final acceptance of balance reports, the settings of all valves, splitters, dampers, and other adjustment devices shall be permanently marked so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15011A - PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. This Section contains General Provisions related specifically to the Plumbing Work.
 - 1. Quality Assurance
 - 2. Protection
 - 3. Coordination and Sequencing
 - 4. General Completion
 - 5. Painting and Finishing
 - 6. Excavation for Plumbing Work
 - 7. Concrete for Plumbing Work
- B. Drawings and General Provisions of Contract, including General and Supplementary Conditions, apply to this section.

1.02 GENERAL

- A. This Contractor, as well as sub-contractors for his work, must carefully read the "Instructions to Bidders" and study the plans and specifications.
 - 1. It is the intention of these specifications to provide for the furnishing and installing of the plumbing equipment complete as shown and specified. Any work or changes which may be evidently necessary to complete the installation shall be furnished by the Contractor as being included in this Contract.
 - 2. During the course of the work, should any ambiguities or discrepancies be found in the specifications to which the Contractor has failed to call attention to before submission of his bid, then the Engineer shall interpret the intent of the specifications, and the Contractor hereby agrees to abide by the Engineer's interpretation and agrees to carry out the work in accordance with the decision of the Engineer. It is expressly stipulated that neither the instructions nor the specifications shall take precedence, one over the other, and it is further stipulated that the Engineer may interpret or construe the specifications of the work, and of that question the Engineer shall be the sole judge.
 - 3. Where no specified kind of quality of material is given, a first class standard article as approved by the Engineer shall be furnished. The specifications do not undertake to illustrate or set forth every item necessary for the work.

4. Small details not usually shown or specified but necessary for its proper installation and finishing shall be included in the Contractor's estimate, the same as if hereby specified or shown.

1.03 QUALITY ASSURANCE

A. Laws, Permits, Inspections.

1. Comply with the latest revisions of New York State Uniform Fire Protection and Construction Code, International Plumbing Code, any Local Codes or Regulations that apply.
2. Underwriters Laboratories label required for all electrical materials carrying 50 volts or more.
3. Comply with New York State Energy Conservation Construction Code, as referenced in NYCRR.
4. Comply with N.Y. State Education Department Manual of Planning Standards.
5. Comply to requirements of drawings and specifications that are in excess of governing codes.
6. Comply with section 1621 of the New York State Building Code for seismic requirements.
7. Do not install work as specified or shown if in conflict with governing code. Notify Engineer and request direction.
8. Pay all Inspection and Permit fees.
9. Provide Certificate of Inspection from all governing authorities.

B. Reference to technical society, organization, body or section made in accordance with the following abbreviations:

1. AGA - American Gas Association
2. AIA - American Institute of Architects
3. AMCA - American Moving and Conditioning Association, Inc.
4. ANSI - American National Standards Institute.
5. ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
6. ASME - American Society of Mechanical Engineers
7. ASTM - American Society of Testing Materials
8. AWS - American Welding Society Code
9. AWWA - American Water Works Association
10. CS - Commercial Standard
11. FS - Federal Specification
12. IEEE - Institute of Electric and Electronics Engineers
13. NEC - National Electric Code
14. NEMA - National Electrical Manufacturer's Association
15. NFPA - National Fire Protection Association
16. NYBFU - New York Board of Fire Underwriters
17. NYCRR - Codes, Rule and Regulations of the State of New York.
18. NSF - National Sanitation Foundation
19. PDI - Plumbing and Drainage Institute.

- 20. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
 - 21. USASI - United States of America Standards
 - 22. UL - Underwriters' Laboratories, Inc.
- C. Contractor submission of equivalent or substitute items other than those specified is at Contractor convenience only. If a substitution or equivalent is accepted, the Contractor shall coordinate the installation of the substitute or equivalent and make all associated changes required. The Contractor also waives any claim for additional costs associated with the substitute / equivalent which becomes apparent before, during or after installation. The Contractor agrees to bear any and all additional costs to all other contractors or subcontractors which are caused by the incorporation of the substitution / equivalent.

1.04 PROTECTION

- A. Protect equipment from damage, including water, chemical, mechanical injury and theft.
- B. Replace damaged equipment or components.
- C. Close and waterproof between sleeves, openings, pipes and voids in walls, floors and foundations to prevent entrance of water or moisture.
- D. Holes made in firewalls, partitions, fire stops, shall be patched to maintain fire rating integrity.
- E. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris and moisture.
- F. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.
- G. Protect flanges, fittings, and piping specialties from moisture and dirt.
- H. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.05 COORDINATION AND SEQUENCING

- A. Coordinate plumbing equipment installation with other building components.
- B. Arrange for chases, slots and openings in building structure during progress of construction, to allow for plumbing installations.

- C. Coordinate the installation of required supporting devices set sleeves in poured-in-place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of plumbing systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Section 15052A "Access to Plumbing Work."
- G. Coordinate installation of identifying devices after completion of covering and painting, where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.
- H. Coordination with other trades: Right-of-Way as follows:
 - 1. Light Fixtures.
 - 2. Fire Suppression.
 - 3. Steam and condensate piping.
 - 4. Hot water supply and hot water return piping.
 - 5. Drain Pipes and Vents
 - 6. Ductwork
 - 7. HVAC Piping
 - 8. Domestic Water Piping
 - 9. Electrical Conduit

1.06 GENERAL COMPLETION

- A. Oiling Equipment.
 - 1. Lubricate equipment and motors in accordance with manufacturer's requirements. Provide lubrication chart in frame mount where directed by Owner.
- B. Instructions to Owner's Representative.
 - 1. Give notice to Engineer when all systems are installed and operating.
 - 2. Obtain name of Owner's Representative to receive instructions.
 - 3. Schedule instructions of Owner's Representative by manufacturer's representative and instruct Owner in system

installation and operation for all equipment installed under this contract.

- C. Provide Operation and Maintenance manuals in accordance with the Requirements of Division 1 "Contract Closeout" Section.

1.07 PAINTING AND FINISHING

- A. Refer to Division 9, Section "Painting" for field painting Requirements.
- B. Damage and Touch-up: Repair marred and damaged factory painted finishes with materials and procedures to match original factory finish.

1.08 CUTTING AND PATCHING - SEE SPECIFICATION SECTION 15060A

1.09 EXCAVATION FOR PLUMBING WORK

- A. Description of Work: Types of excavation for plumbing related work specified in this section include:
 - 1. Underground plumbing utilities and services.
 - 2. Underground tanks and equipment enclosures.
 - 3. Interior and Exterior water distribution systems to 5 feet outside of the building or where indicated on the plans.
 - 4. Interior and Exterior sanitary and storm drainage systems to 5 feet outside of the building or where indicated on the plans.
- B. Project Conditions.
 - 1. Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Liabilities arising out of performance of work is responsibility of Contractor doing excavation.
 - 2. Protect persons from injury at excavations by barricades, warnings, and illumination.
 - 3. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install plumbing work on frozen excavation bases or sub bases.

1.10 CONCRETE FOR PLUMBING WORK

- A. Types of concrete for plumbing related work specified in this section include:
 - 1. Lean concrete backfill to support plumbing work.

2. Encasement of mechanical work.
3. Plumbing equipment foundations and housekeeping pads.
4. Inertia bases for isolation of plumbing work.
5. Rough grouting in and around plumbing work.
6. Patching concrete cuts to accommodate plumbing work.
7. Thrust block.

1.11 REBATES

- A. The Division 15A Contractor shall assist the Owner in applying for any available rebates from manufacturer's, utility companies, etc. on equipment or materials installed under the contract. Provide all required documentation and assist in the completion of applications as required to complete the rebate process. All proceeds from rebates remain the property of the Owner.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

- A. Sub base Material (Bedding): Graded mixture of gravel, sand crushed stone or crushed slag.
- B. Backfill Material: Soil material free of large stones, shale, wood and similar material.

2.02 CONCRETE

- A. Concrete installed by this division shall comply with Division 3 Specifications for Concrete.

PART 3 - EXECUTION

3.01 EXCAVATION - GENERAL

- A. Do not excavate for plumbing work until work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum.
- B. Excavate with vertical sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross bracing to sustain sides of excavation. Remove sheeting and cross bracing during backfilling wherever such removal would not endanger work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.
- C. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other mechanical work to provide minimum practical but adequate working clearance.

- C. Depth for direct support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand excavate bottom cut to accurate elevations, undercut at pipe hubs.
- D. Depth for sub base support: For large piping (6" pipe size and larger), tanks, and where indicated for other plumbing work, excavate for installation of sub base material in depth indicated or, if not otherwise indicated, 6" below bottom of work to be supported.
- E. Depth for unsatisfactory soil or rock conditions: Where directed, (because of unsatisfactory conditions at bottom of indicated excavation), excavate additional depth as directed to reach satisfactory conditions. Backfill with sub base material compacted as directed, to indicate excavation depth.
- F. Store excavated material (temporarily) near excavation, in manner, which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).
 - 1. Dispose of excavated material, which is either in excess of quantity needed for backfilling, or does not comply with requirements for backfill material.
 - a. Remove unused material from project site, and dispose of it in lawful manner.

3.02 WATER CONTROL

- A. Maintain dry excavations for plumbing work, by removing water. Protect excavations from inflow of surface water. Pump minor inflow of ground water from excavations, protect excavations from major inflow of ground water, by installing temporary sheeting and waterproofing. Provide adequate barriers which will protect other excavations and below grade property from being damage by water, sediment or erosion from or through plumbing work excavations.

3.03 BACKFILLING

- A. Do not backfill until installed plumbing work has been tested and accepted.
- B. Install drainage fill where indicated, and tamp to uniform firm density.
- C. Backfill with finely graded sub base material to 6" above wrapped, coated and plastic piping and tanks, or as shown on drawings and to centerline of other tanks.
- D. Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials.

- E. Backfill simultaneously on opposite side of plumbing work, and compact simultaneously, do not dislocate work from installed positions.
- F. Backfill excavations in 8" high courses of backfill material uniformly compacted to the following densities (% of maximum density, ASTM D1557), using power-driven hand operated compaction equipment.
 - 1. Lawn and landscaped areas: 85% for cohesive soils, 90% for cohesion less soil.
 - 2. Paved areas and roadways: 90% for cohesive soils, 95% for cohesion less soils.
- G. Backfill to elevations matching adjacent grades, at time of backfilling excavations for mechanical work. Return surfaces to original condition.
- H. After covering piping with 6" layer of approved fill backfill and compact excavations beneath:
 - 1. New foundations.
 - 2. Slabs on grade.
 - 3. Areas to be paved by General Contractor.

3.04 CONCRETE BASES

- A. Construct concrete equipment bases of minimum 4 inches higher or as shown on drawings, and not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.

3.05 CONCRETE GENERAL

- A. Concrete installed by this division shall comply with Division 3 Specifications for Concrete.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15013A - CODES, STANDARDS, AND PERMITS

1.01 GENERAL

A. The entire installation shall be made in accordance with State rules and regulations and shall also conform with the standards of the National Board of Fire Underwriters for this installation and the local Board of Fire Underwriters having jurisdiction. The installation shall also comply with air pollution requirements of the State of New York and Industrial Code Rule 4 of the State of New York Department of Labor, Board of Standards and Appeals, dated March 31, 1965, and all other ordinances having jurisdiction.

B. The Contractor shall submit to all authorities having jurisdiction all required applications and shall secure all necessary permits, tests, and inspections required for final approval.

C. Certain standard and staple materials are described by reference to standard specifications. These standards are as follows:

AGA	American Gas Association
ASA-B9	Safety Code for Mechanical Refrigeration
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
CGA	Compressed Gas Association
AWWA	American Water Works Association
CS	Commercial Standard
FS	Federal Specification
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
PDI	Plumbing and Drainage Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
USASI	United States of America Standards Institute
UL	Underwriters' Laboratories
	New York State Uniformed Fire Prevention and Building Code
IPC	International Plumbing Code

D. All electric facilities shall receive the Underwriters label and be installed in accordance with the latest issue of the National Electric Code requirements.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15014A - SCHEDULE OF EQUIVALENCY

1.01 GENERAL

- A. Wherever a brand name or manufacturer is named in this specification, it indicates the standard of quality or purpose desired. Where one certain kind, type, brand, or manufacturer of materials is named, it shall be regarded as the standard quality. Where two or more are named, these are presumed to be equal, and the Contractor may select one of those items; if the Contractor desires to use any other kind, type, brand, or manufacturer of material other than named in the specifications, he shall submit a list, with his bid, stating what material, equipment, or method is offered as equal and how it affects the contract price.
- B. The equivalency of such items is to be judged by the Engineer whenever offered by bidders as equivalent to the Base Bid items and so reported to the Owner for his ultimate decision.
- C. The following manufacturers are approved equivalents for those listed in the specifications:
1. Insulation:

Johns-Mansville Corporation
Owens-Corning Fiberglass Corporation
Knauf
Certainteed
 2. Drains, Cleanouts, Flashing Sleeves, Wall Hydrants, Water Hammer Arrestors, Interceptors, and Fixture Supports

Zurn Manufacturing Company
Josam Manufacturing Company
Jay R. Smith Company
 3. Plumbing Fixtures

Zurn
American Standard
Crane Company
 4. Fixture Trim

American Standard
Chicago Faucet Company
T & S Brass and Bronze Works
 5. Flush Valves

Zurn
Sloan Valve Company
American Standard

6. Toilet Seats

American Standard
Olsonite
C.F. Church Company

7. Access Doors

Karp Associates, Inc.
Zurn Manufacturing Company
Wilcox Steel Company

8. Valves

Jenkins Brothers
Lukenheimer Company
Walworth Company

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15015A - MAINTENANCE INSTRUCTIONS

PART 1 - GENERAL

1.01 GENERAL

- A. In addition to the requirements outlined in the "General Provisions", the following information shall be incorporated:
1. Manufacturer's plumbing equipment parts list of all functional components including control diagrams and wiring diagrams of controllers.
 2. Step by step instructions for each system including preparation for starting, operation, and shutdown. Provide full maintenance manual describing procedures for each new piece of equipment. In addition, provide a video showing / describing step by step instructions for maintenance of each new piece of equipment.
 3. Twelve-month maintenance schedule for each type of equipment.
 4. Possible breakdowns and repairs for each type of equipment.
 5. List of nearest local suppliers for all equipment.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15050A - PLUMBING BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. This Section includes the following basic plumbing materials and methods to complement other Division 15A Sections.
 - 1. Submittals.
 - 2. Pipe joining materials and installation instructions common to piping systems.
 - 3. Piping specialties: Escutcheons, dielectric fittings, sleeves and seals.
 - 4. Non-shrink grout for equipment installations.
 - 5. Drip pans.
 - 6. Pipe supports: Hangers, clamps, support spacing, building attachments, shields and saddles, flashing, miscellaneous materials, and anchors.
 - 7. Field fabricated metal and wood equipment supports.
 - 8. Firestopping.
- B. Pipe and pipe fitting materials are specified in piping system sections.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. NSF 372 and ANSI 61

1.03 SUBMITTALS

- A. General - Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for following piping specialties:
 - 1. Mechanical sleeve seals.
 - 2. Identification materials and devices.
- C. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

1.04 STANDARDS FOR MATERIALS AND WORKMANSHIP

- A. All materials and workmanship shall, at a minimum be in accordance with (in no order of precedence):
 - 1. New York State Codes - latest edition as adopted by the Authority Having Jurisdiction, unless otherwise noted.

2. State and municipal Building Codes and related subcodes.
3. Occupational and Safety Act (OSHA) Requirements.
4. Rules and Regulations of the Authority Having Jurisdiction applicable to the work.
5. National Electrical Standards Association Standard for Good Workmanship in Electrical Construction (NECA-1)
6. Serving utility's rules and regulations for providing service.
7. Contract Drawings and Specifications.
8. Manufacturer recommended installation instructions, practices and procedures for the products being utilized or installed.
9. Where conflicts arise between the above, the more stringent requirement shall be adhered to.

PART 2 - PRODUCTS

2.01 PIPE AND PIPE FITTINGS

- A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.
- C. All fittings NSF 372 ANSI 61.

2.02 PIPE JOINING MATERIALS

- A. Refer to individual piping system specification Sections in Division 15A for special joining materials not listed below.
- B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.
 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, except where thickness or specific material is indicated.
 - a. Full-Face Type: for flat-face, Class 125 cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: for raised-face, Class 250 cast-iron and steel flanges.
 2. AWWA C110, rubber, flat face, 1/8-inch-thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where

other material is indicated.

2.03 PIPING SPECIALTIES

- A. Escutcheons: Manufactured wall, ceiling and floor plates; deep-pattern type, where required to conceal protruding fittings and sleeves.
 - 1. Inside Diameter: Closely fit around pipe, tube and insulation of insulated piping.
 - 2. Outside Diameter: Completely cover opening.
 - 3. Cast Brass: One-piece, with set-screw.
 - a. Finish: Rough brass.
 - b. Finish: Polished chrome plate.
 - 4. Cast Brass: Split casting, with concealed hinge and set-screw.
 - a. Finish: Rough brass.
 - b. Finish: Polished chrome plate.
 - 5. Stamped Steel: One-piece, with set screw and chrome plated finish.
 - 6. Stamped Steel: One-piece with spring clips and chrome plated finish.
 - 7. Stamped Steel: Split plate with concealed hinge, set-screw, and chrome plated finish.
 - 8. Stamped Steel: Split plate with concealed hinge, spring clips and chrome plated finish.
 - 9. Cast-Iron Floor Plate: One-piece casting.
- B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.
 - 1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
 - 2. Insulating Material: Suitable for system fluid, pressure and temperature.
 - 3. Dielectric Unions: Factory-fabricated, union assembly, for 250 psig minimum working pressure at 180 deg F temperature.
 - 4. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system pressures.
 - 5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers and steel backing washers.
 - a. Provide separate companion flanges and steel bolts and nuts for 150 or 300 psig minimum working pressure to suit system pressures.

6. Dielectric Couplings: Galvanized steel coupling, having inert and non-corrosive, thermoplastic lining, with threaded ends and 300 psig minimum working pressure at 225 deg F temperature.
 7. Dielectric Nipples: Electroplated steel nipple, having inert and non-corrosive, thermoplastic lining, with combination of plain, threaded or grooved end types and 300 psig working pressure at 225 deg F temperature.
- C. Mechanical Sleeve Seals: Modular, watertight, mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.
- D. Sleeves: The following materials are for wall, floor, slab and roof penetrations.
1. Steel Sheet-Metal: 24 gage or heavier, galvanized sheet metal, round tube closed with welded longitudinal joint.
 2. Steel Pipe: ASTM A53, Type E, Grade A, Schedule 40, galvanized, plain ends.
 3. Cast-Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
 4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.
 - a. Penetrating Pipe Deflection: 5 percent without leakage.
 - b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111 of housing and gasket size as required to fit penetrating pipe.
 - c. Pipe Sleeve: AWWA C151, ductile-iron pipe.
 - d. Housing-to-Sleeve Gasket: Rubber or neoprene, push-on type, of manufacturer's design.
 5. Cast-Iron Sleeve Fittings: Commercially-made, sleeve having integral clamping flange, with clamping ring, bolts and nuts for membrane flashing.
 - a. Underdeck Clamp: Clamping ring with set screws.

2.04 VALVES

- A. Refer to individual piping system specifications section in Division 15A for special valves not listed below.
- B. General

1. Valves shall be installed only in upright vertical or horizontal positions unless specifically otherwise required by the drawings.
2. All valves shall be installed in accessible locations to facilitate easy removal for repair or replacement. Where not possible provide access doors. Refer to 15052A.
3. All gate and globe valves shall be designed for repacking when wide open under pressure.
4. Domestic water system valves 3/4" and smaller and all balancing valves shall be globe type.
5. All valves of the same type shall be the products of a single manufacturer and shall comply with ANSI B31.1.
6. All valves for domestic water use shall be no lead type in accordance with NSF-372 ANSI 61.

C. GATE VALVES

1. Cold, hot, and hot water return, 2" and smaller: Ball type solder end connections. Jenkins, Nibco, or equal Type B. 3" and larger gate valve: Jenkins, Nibco, or equal Type 1, Class "A", Style 3.

D. GLOBE VALVES

1. 3" or smaller: Jenkins, Nibco, or equal. Over 3": Jenkins, Nibco, or equal, Type 1 with cast iron body and bronze trim.

E. CHECK VALVES

1. 3" and smaller: Jenkins, Nibco, or equal, Type IV, Class "A".

2.05 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi, 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

2.06 DRIP PANS

- A. Provide drip pans fabricated from corrosion resistant sheet metal with watertight joints, and with edges turned up 2-1/2 inches. Reinforce top, either by structural angles or by folding over according to size. Provide hole, gasket, and flange at low point for watertight joint and 1-inch drain line connection.

2.07 HORIZONTAL PIPING HANGERS AND SUPPORTS

- A. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports. Hangers and supports shall be in complete conformance with Chapter 3 of the New York State Plumbing Code. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper plated hangers and supports for copper piping systems.
- B. Adjustable steel clevises.
1. Material: Carbon steel, copper plated for copper piping.
 2. Finish: Black or copper plated.
 3. Adjustment: Hanger to be adjustable for vertical height of pipe without removing the pipe.

2.08 VERTICAL PIPING CLAMPS

- A. Two bolt riser clamp.
1. Material: Carbon steel copper plated for copper piping.
 2. Finish: Black or copper plated.

2.09 HANGER ROD AND SPACING

ROD SIZE AND SPACING SCHEDULE

<u>Pipe Size</u>	<u>Maximum Spacing</u>		<u>Rod Size</u>
	Steel	Copper	
1/2 to 1	6 ft.	6 ft.	3/8"
1-1/4 to 1-1/2	6 ft.	6 ft.	3/8"
2	12 ft.	10 ft.	3/8"
2-1/2 - 3-1/2	12 ft.	10 ft.	1/2"
4 - 5	12 ft.	10 ft.	5/8"
6	12 ft.	10 ft.	3/4"
8 - 12	12 ft.		7/8"
14 - 16	12 ft.		1"

Note: Cast Iron - support at every hub or coupling 5 ft. maximum spacing.

2.10 BUILDING ATTACHMENTS

- A. General: Except as otherwise indicated provide factory fabricated building attachments of one of the following types listed, selected by Installer to suit building substrate conditions. Select size of building attachments to suit hanger rods. Provide copper plated building attachments for copper piping systems.
- B. On Structural Steel:

1. For pipes 2" and smaller: C clamps with lock nuts similar to Anvil figure 86.
 2. For pipes 5" and larger: Use beam clamps similar to Anvil figure 228 or 292.
- C. On New Masonry:
1. Use concrete inserts similar to Anvil figure 281.
- D. On Existing Concrete:
1. Use expansion case similar to Anvil figure 117.
- E. On Wood:
1. Use coach screw rods Anvil figure 142. Ceiling flanges Anvil figure 153, or fabricated angle clips. Use wood drive screws or lag bolts as fasteners.

2.11 SHIELDS AND SADDLES

- A. General: For insulated piping.
- B. Shields: 16-gauge galvanized metal.
- C. Protection saddles:
1. Hardwood block
 2. Steel saddle Anvil 160 series

2.12 FLASHING MATERIALS

- A. General: Provide flashings for each penetration of plumbing systems through roofs or waterproof membranes.
- B. Molded Pipe Flashing: Compatible with single ply membranes with which it is used and manufactured by membrane manufacturer.
- C. Coated copper flashing: Provide cold-rolled sheet copper (ANSI/ASTM B 370), of proper temper for applications shown and required forming, coated on one side with not less than 0.06 lbs. per sq. ft. of antimony (ANSI/ASTM B 101, Type I, Class A), weighing 1.06 lbs. per sq. ft., except as otherwise indicated.
- D. Bituminous coating: FS TT-C-494, or MIL-C-18480, or SSPC-Paint 12, cold applied solvent type bituminous mastic coating for application in dry film thickness of 15 mils per coat.

2.13 MISCELLANEOUS MATERIALS

- A. Metal framing: Provide products complying with NEMA.
- B. Steel plates, shapes and bars: Provide products complying with ANSI/ASTM A 36.

- C. Heavy duty steel trapezes: Fabricate from steel shapes selected for loads required, weld steel in accordance with American Welding Society (AWS) standards.
- D. Pipe guides: Provide factory fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two section outer cylinder and base with a two section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

2.14 ANCHORS

- A. Fabricate pipe anchors from 3 x 3 x 1/2" angle.
- B. Use pipe protection saddles one size larger than piping.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15A specify piping installation requirements unique to the piping system.
- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordinate drawings.
- C. Pitch piping at low points. Provide Manual Blowdown for maintenance.
- D. Install piping at indicated slope.
- E. Install components having pressure rating equal to or greater than system operating pressure.
- F. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.
- G. Install piping free of sags and bends.
- H. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.
- I. Install piping tight to slabs, beams, joists, columns, walls and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

- J. Install piping to allow application of insulation plus 1-inch clearance around insulation.
- K. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- L. Install fittings for changes in direction and branch connections.
- M. Install couplings according to manufacturer's printed instructions.
- N. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wallboard partitions and suspended ceilings according to the following:
 - 1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw and polished chrome-plated finish. Use split-casting escutcheons where required, for existing piping.
 - 2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.
 - 3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
 - 4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips and chrome-plated finish.
 - 5. Piping in Utility Areas: Cast-brass or stamped-steel with set-screw or spring clips.
- O. Sleeves are not required for core drilled holes.
- P. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.
- Q. Install sleeves for pipes passing through concrete and masonry walls, concrete floor and roof slabs, and where indicated.
- R. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs and where indicated.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.
 - 2. Build sleeves into new walls and slabs as work progresses.
 - 3. Install large enough sleeves to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. CPVC Pipe Sleeves: For pipes smaller than 6 inches.
 - b. Steel Pipe Sleeves: For pipes smaller than 6 inches.
 - c. Steel Sheet-Metal Sleeves: For pipes 6 inches and

- larger, penetrating gypsum-board partitions.
- d. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
- e. Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.
- 4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants.
- S. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeve and mechanical sleeve seals. Size sleeve for 1 inch annular clear space between pipe and sleeve for installation of mechanical seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger.
 - 3. Assemble and install mechanical seals according to manufacturer's printed instructions.
- T. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.
- U. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.
- V. Verify final equipment locations for roughing-in.
- W. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- X. Piping Joint Construction: Joint pipe and fittings as follows and as specifically required in individual piping system specification Sections.
 - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - 3. Soldered Joints: Construct joints according to AWS "Soldering Manual", "The Soldering of Pipe and Tube".
 - 4. Brazed Joints: Construct joints according to AWS "Brazing Manual", "Pipe and Tube".
 - 5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:

- a. Note the internal length of threads in fittings or valve ends and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
 - b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
 - c. Align threads at point of assembly.
 - d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
 - e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- Y. Welded Joints: Construct joints according to AWS "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to "Quality Assurance" article.
- Z. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
- AA. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
 - 1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2 inches or smaller threaded pipe connection.
 - 2. Install flanges, in piping 2 1/2 inches and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
 - 3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials or dissimilar metals.
 - 4. Wet Piping Systems (Water): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.02 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to provide the maximum possible headroom, where mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

- D. Install mechanical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
- E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.03 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit and place miscellaneous metal supports accurately in location, alignment and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1 "Structural Welding Code - Steel".

3.04 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

- A. Cut, fit and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.05 GROUTING

- A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms for placement of grout, as required.
- D. Avoid air entrapment when placing grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases to provide a smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's printed instructions

3.06 DRIP PANS

- A. Locate drip pans under piping passing over or within 3 feet

horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, and weld rods to sides of drip pan. Brace to prevent sagging or swaying.

Connect 1-inch drain line to drain connection and run to nearest plumbing drain or elsewhere as indicated. Provide Leak Detection Alarm Floodmaster RS097. Provide power to unit.

3.07 INSTALLATION OF BUILDING ATTACHMENTS

- A. Install building attachments at required locations in concrete, in wood or on structural steel for proper piping support. Space attachments within maximum piping span length indicated. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed, fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.08 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Install hangers and supports of same type and style for grouped piping runs.
- C. Support fire water piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.
- E. Provisions for movement:
 - 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
 - 2. Load distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
 - 3. Pipe slopes: Install hangers and supports to provide indicated pipe slopes.

- F. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.09 SHIELDS AND SADDLES FOR INSULATED PIPING

- A. 4" and below use 16 gauge x 12 inch long shield with oversized hanger outside insulation.
- B. 6" and above use hardwood protection saddle with 16 gauge x 18 inch long shield with oversized hanger outside insulation.
- C. 6" and above use steel protection saddle. Fill void between shield and pipe with insulation. Cover with vapor barrier. Protect barrier with 16 gauge x 18 inch long shield with oversized hanger outside assembly.

3.10 INSTALLATION OF ANCHORS

- A. Install anchors at proper locations to prevent stresses and to prevent transfer of loading and stresses to connected equipment.
- B. Fabricate and install anchor by welding steel shapes, plates and bars to piping and to structure.
- C. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.
- D. Anchor spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.11 FLASHINGS

- A. Manufacturer's recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.
- B. Coat back side of metal flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent separation as recommended by manufacturer of metal.
- C. On vertical surfaces, lap flashings minimum of 3".
- D. On sloping surfaces, for slopes of not less than 6" in 12", lap unsealed flashings minimum of 6".
- E. For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges minimum of 6" for embedment.

3.12 FIRE STOPPING

- A. Provide UL listed and tested firestopping material, silicone elastomer specifically formulated for use in horizontal and vertical applications. The material shall possess intumescent characteristics, and upon exposure to heat above 250 degrees F. shall expand to not less than five times its original volume to form a fireproof envelope UL rated for 2- and 3-hours protection, when applied in accordance with the manufacturer's recommendation.
- B. See section 15511 for additional fire stopping requirements.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15052A - ACCESS TO PLUMBING WORK

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Access doors in walls and ceilings.

1.02 SUBMITTALS

- A. Product data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.

1.03 QUALITY ASSURANCE

- A. Fire resistance ratings: Where fire resistance rating is required for construction penetrated by access units, provide UL listed and labeled units, except for units which are smaller than minimum requirements.

PART 2 - PRODUCTS

2.01 ACCESS DOORS

- A. Where walls and ceilings must be penetrated for access to mechanical work, provide types of access doors indicated. Furnish sizes indicated or, where not otherwise indicated, furnish adequate size for intended and necessary access. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, complete with anchorages and hardware.
- B. Construction: Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground smooth, 16-gauge frames and 14-gauge flush panel doors, 175 degree swing with concealed spring hinges, flush screwdriver-operated cam locks, factory applied rust-inhibitive prime coat paint finish.
- C. Available manufacturers
 - 1. Milcor Div., Inryco Inc.
 - 2. Smith (Jay R.) Mfg. Co.
 - 3. Zurn Industries, Inc.

PART 3 - EXECUTION

3.01 GENERAL

- A. Comply with manufacturer's instructions for installation of access doors.

- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and panels after installation for proper operation.
- D. Remove or replace panels or frames which are warped, bowed, or otherwise damaged.
- E. Paint access doors to match surrounding surfaces.
- F. In wet and damp locations provide stainless steel doors.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15060A - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 GENERAL

- A. Each Contractor shall be responsible for his cutting and patching. The Contractor shall also be responsible for all finish patching and painting.
- B. Each Contractor shall replace and patch any surfaces of any structure disturbed by his operations and his work, even if such operations and work are outside the contract limit. Such replacement, repair, and patching shall be with similar material and shall restore surfaces as they exist, or better.
- C. Cut and alter existing materials as required to perform the work. Limit cutting to the smallest amount necessary for proper installation of the work.
- D. Where the removal of existing building components necessitates the addition of patching in new materials, such work shall be executed to insure the fire resistance rating of the system and visual continuity with adjacent surfaces, whether or not the remedial work is specifically detailed on the drawings.
- E. Perform the removal work with such care as may be required to prevent damage to adjoining construction which is to remain.
- F. Do not disturb any existing structure, piping, apparatus, or other construction which must remain unless expressly required by the contract. Where cutting or removals are required in existing construction, do the work in a manner that will safeguard and not endanger the structure and as approved by the Engineer.
- G. If unforeseen obstructions are encountered, take all precautions necessary to prevent damage and obtain full instructions from the Engineer before proceeding with the work.
- H. Remove from the site all debris and other materials resulting from the alterations and removals, subject to the General Requirements.
- I. Fill all voids and patch existing construction and finishes damaged within area of alteration work unless otherwise indicated. Provide new materials to match existing corresponding items as closely as practicable.
- J. Any pipe penetrations through fire rated areas shall be accomplished using Hilti fire barrier products in sheets, strips, or caulk using ASTM, UL, and FM standards.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15180A - PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Extent of plumbing insulation work required by this section is indicated on Drawings and by requirements of this section.
- B. Work includes thermal insulation for the following:
 - 1. Domestic cold water piping.
 - 2. Domestic hot water and hot water circulating piping.
 - 3. Domestic tempered water piping
 - 4. Storm water drainage piping.
 - 5. Roof drain bodies.

1.02 QUALITY ASSURANCE

- A. Fire Hazard Classification: In accordance with ASTM E-84, NFPA 255 and UL 723, for insulation systems, including insulation, adhesives and coverings, not to exceed the following:
 - 1. Flame spread 25.
 - 2. Fuel contributed 50.
 - 3. Smoke developed 50.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturers specification sheets, installation instructions, fire and smoke ratings. Submit schedule matching insulation type to mechanical systems and equipment.

1.04 INSULATION THICKNESS

- A. Insulate domestic hot water supply, tempered water, and hot water recirculating piping with insulation thickness of fiberglass piping insulation as shown below, ASTM C 547 Class 1, with All Service Jacket.
- B. Insulate domestic cold water Branches and Mains with insulation thickness as shown below of fiberglass piping insulation, ASTM C 547 Class 1.
- C. Insulate storm water piping and roof drains with 1" insulation thickness of fiberglass insulation, ASTM C 547 Class 1.
- D. Insulate condensate drain to HVAC units with 1" fiberglass insulation.

**To Meet or Exceed Energy Conservation Construction Code of the State of
New York**

THICKNESS TABLE

	<u>IPS 1-1/4" & Below</u>	<u>IPS 1-1/2" to 4"</u>	<u>IPS Above 4"</u>
Hot Water	1"	1-1/2"	1-1/2"
Hot Water Ret.	1"	1-1/2"	N/A
Cold Water	1"	1"	1"
Storm	1"	1"	1"

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label affixed showing fire hazard indexes of products.
- B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet installation, remove from project site.

PART 2 - PRODUCTS

2.01 DOMESTIC COLD WATER, HOT WATER, TEMPERED, AND HOT WATER CIRCULATING
PIPING

- A. Scope: Insulate all mains, branches, fittings, flanges and valves including those in ceiling spaces, pipe chases or spaces. Terminate insulation at the fixture supply stops. Insulate equipment connections to the equipment stop.
- B. Type:
 - 1. Pre-formed sectional type nominal 3# density glass fiber in standard 3' long sections tightly butted together. K factor (Thermal conductivity) of 0.23 at 75° mean. Make: Mansville, Owens-Corning, or Knauf.
- C. Finish:
 - 1. Main mechanical room piping and exposed risers and runouts in finished rooms: Factory-applied All Service Jacket with self-sealing laps.
 - 2. Valves, fittings and flanges: Equal thickness of fiberglass insulation with Zeston fittings covers or equal by Ham-Fab, Mansville.

2.02 STORM WATER PIPING - ABOVE GROUND

- A. Scope: Insulate all horizontal piping above ground including underside of roof drain bodies and all fittings.
 - B. Type: Pipe insulation shall be preformed sectional type nominal 3 pound density glass fiber in standard 3 foot long sections with a K factor of 0.23 at 75 mean and factory applied All Service
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Jackets. Seal joints with 3" All Service Jacket.

- C. Fittings & Drain Bodies: Insulate all fittings, hubs, flange and Drain bodies with fiberglass pre-moulded fitting insulation or with 1" resilient fiberglass blanket. (3/4) pcf density minimum) wrapped around the fitting or drain body, tied down with wire or jute. Compress blanket 50% in installation. Coat each fitting or drain body with two 1/8" coats of vapor barrier mastic reinforced with glass fabric extending 2" onto adjacent pipes.

2.03 METAL JACKETED PIPE INSULATION

- A. Scope: Pipe exposed to weather or physical abuse shall be insulated with .016" aluminum jacket over fiberglass insulation of the specified thickness. Sections shall be made in 36" lengths.
- B. Fire and smoke Hazard Classification shall not exceed flame spread index of 25 or less and smoke developed index of 50 or less as tested by ASTM E-84, NFPA 255 or UL 723.
- C. Manville Micro-Lok 650ML.

2.04 EQUIPMENT INSULATION MATERIALS

- A. Rigid Fiberglass Equipment Insulation: ASTM C 612, Class 2.
- B. Flexible Fiberglass Equipment Insulation: ASTM C 553, Type I, Class B-4.
- C. Jacketing Material for Equipment Insulation: Provide pre-sized glass cloth jacketing material, not less than 7.8 ounces per square yard, or metal jacket at Installer's option, except as otherwise indicated.
- D. Equipment Insulation Compounds: Provide adhesives, cements, sealers, mastics and protective finishes as recommended by insulation manufacturer for applications indicated.
- E. Equipment Insulation Accessories: Provide staples, bands, wire, wire netting, tape, corner angles, anchors and stud pins as recommended by insulation manufacturer for applications indicated.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Apply insulation in accordance with the Schedule of Insulation on the Contract Specifications.
- B. Use only insulation and finish materials including adhesives, cements, and mastics which conform to the requirements of all local codes and ordinances.
- C. Fire resistant adhesive is highly flammable in liquid form. Eliminate welding, smoking, or other sources of ignition during application.

- D. Apply insulation after all piping pressure tests, as described in Piping Installation Procedure, have been completed.
- E. Clean surfaces of loose scale, dirt, oil, and other foreign matter and dry prior to insulating.
 - 1. Detail for space @ blowdown
 - 2. Detail for pipe @ insulation penetrating wall.
- F. Apply insulation to completely cover piping surface. Do not insulate over weld certification stamps.
- G. "Exposed" as used in this section means exposed to view. "Concealed" means concealed to view such as in furred chases or above suspended ceiling. Penthouse and equipment rooms are considered exposed locations.
- H. Fill surface imperfections in the insulation such as chipped edges, small joints or cracks, and small voids or holes with appropriate insulation material and smooth with skim coat of hydraulic-setting insulating cement. Vapor barriers shall be continuous and unbroken at hanger installations.
- I. Fit inside diameter of insulation sections or segments to outside curvature of pipe or previous insulation layer.
- J. Where standard insulation shapes are not available, cut, score, or miter segments of appropriate block to fit contour of pipe. Stagger joints of adjoining segments. Fit insulation carefully and secure with No. 20 gage galvanized annealed steel wire. Finish with a smoothing coat of hydraulic-setting insulating cement.
- K. Insulate valves, strainer, fittings, and flanges with identical material, density, thickness, and surface finish as the piping insulation. All edges shall be filled with filler and finished with a smoothing coat of hydraulic-setting insulating cement.
- L. Insulate the entire surface of fittings and strainers. Insulate valves up to and including bonnets, unless authorized otherwise by Project Engineer. Do not cover removable valve bonnets.
- M. Insulate strainers to permit removal of the basket without disturbing the insulation of the strainer body. Strainer covers shall be molded and taped to upper section of insulation.
- N. Bevel the ends of pipe insulation adjacent to flanges to permit bolt removal. Provide a collar of sectional block insulation over the flanges and extend a minimum of 2 inches over the adjacent pipe insulation. Fasten with staples to permit easy removal. Prior to applying collar fill annular spaces with loose insulation.
- O. Insulate all piping through sleeves.
- P. Where pipelines pass through masonry walls or floors, completely fill the space between outside of pipe or insulation and the

inside of the sleeve or framed opening with fibrous mineral wool or fiberglass pipe insulation.

- Q. When it is unavoidable and hangers for cold lines must be installed directly on the pipe, insulate and finish the entire hanger and the rod for a length of not less than 12 inches above the pipe.
- R. Apply insulation to completely cover metal surfaces.
- S. Cut, score, or miter insulation to fit shape and contour of equipment. Where surfaces are flat, cylindrical, or regularly curved, use premolded blocks or segments.
- T. Where required, provide permanently fastened angles or plates to support insulation.
- U. Apply insulation on cover plates, heads and access openings as separate sections, with insulation cut back for access to boltheads and other fasteners.
- V. Do not insulate over nameplates. Cut back insulation and line the insulation edges with 24 gage galvanized steel.
- W. Surface Finish.
 - 1. Apply surface finish to present a tight, smooth appearance.
 - 2. Do not apply sealant or cement until all previous applications of cement and adhesives have thoroughly dried.
 - 3. Extend surface finish to protect all insulation surfaces. Prevent raw edges or ends of insulation from being exposed.

3.02 INSTALLATION OF PIPING INSULATION

- A. Apply to pipes with side and end joints butted tightly per manufacturer's directions.
- B. Where joints in insulation occur, and at hangers, take extra precautions to seal the vapor barrier with adhesive BF 95-44 so that no moisture penetration will occur. Notify Engineer when insulation is complete so he may make inspection before walls are closed in or ceilings applied.
- C. Where fiberglass insulation is exposed in an occupied room, apply pre-sized glass cloth vapor barrier jacket in same manner using same type of adhesive (or use ASI/SSL).
- D. Repair all breaks in the jacket with 4" wide strip of vapor barrier jackets (FRGC or SSL as required) applied smoothly and securely. When applying adhesive at temperature below 75°F, use staples with an additional brush coat of adhesive over the exterior of the staples.
- E. Adhere 4" wide strips of jacket material smoothly and securely over all end joints with vapor barrier adhesive as above to insure a continuous vapor barrier.

- F. Apply insulation on all cold surfaces where vapor barrier jackets are used with a continuous, unbroken vapor seal. Insulate and vapor seal hangers, supports, anchors, etc., that are securely directed to cold surfaces to prevent condensation.

3.03 EQUIPMENT INSULATION

- A. Cold Equipment (Below Ambient Temperature)
 - 1. Application Requirements: Insulate the following cold equipment:
 - a. Domestic Hot water expansion tanks
 - 2. Insulate each item of equipment specified above with fiberglass: 2" thick
- B. Hot Equipment (Above Ambient Temperature)
 - 1. Application Requirements: Insulate the following hot equipment.
 - a. Hot water storage tanks
 - b. Water heaters (not insulated by manufacturer)
 - 2. Insulate each item of equipment specified above with fiberglass: 2" thick.

3.04 SUPPORT OF INSULATED PIPE LINES

- A. Scope: Install inserts at each hanger or support for all water lines for sizes 1-1/2" and up, or 16 gauge electro-galvanized carbon steel shields may be used in lieu of inserts. Install supporting devices on insulated lines with hangers with insulation shields.
- B. Inserts:
 - 1. Inserts between the pipe and pipe hangers shall consist rigid pipe insulation of equal thickness to the adjoining fiberglass insulation and shall be provided with vapor barrier where required.
 - 2. Insulation inserts shall not be less than the following lengths:
 - 1-1/2" to 2-1/2" pipe size, use 6" length
 - 3" to 6" pipe size, use 9" length
- C. Supporting Devices: Use cork stoppers, short lengths of wood dowels or wood blocks of the same thickness as insulation. Curve the support device surfaces to match the curve of the metal shield. Metal shields are provided with the hanger.

3.05 ADHESIVES, MASTIC, AND COATINGS

- A. Apply adhesives, mastic and coatings specified at the
PLUMBING INSULATION 15180A-6
Rev. 02-14-19

manufacturer's recommended coverage per gallon.

3.06 EXPOSED RISERS AND RUNOUTS

- A. Finish exposed risers and runouts in occupied rooms with ALL SERVICE JACKET.
- B. Occupied areas mean all areas except ceiling spaces, crawl spaces and closed off pipe spaces or chases.

3.07 EXISTING INSULATION REPAIR

- A. Repair damaged sections of existing mechanical insulation damaged during this construction period. Use insulation of the same thickness as existing insulation. Install new jacket lapping and seal over existing.

3.08 PROTECTION AND REPLACEMENT

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.
- C. Surface Finish: No surface finish required.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15411A - PLUMBING DOMESTIC WATER PIPING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY OF ITEMS INCLUDED

- A. Extent of domestic water piping systems work is indicated on drawings and schedules, and by requirements of this section.
- B. Applications for domestic water piping systems include the following:
 - 1. Domestic cold water piping.
 - 2. Domestic hot water piping.
 - 3. Domestic recirculating water piping.
 - 4. Water hammer arresters.
 - 5. Valves.
 - 6. Pumps
- C. All domestic water piping systems must comply with the "Lead-Free" Division 15A Specifications. The contractor shall provide the required submittals for all equipment that will be part of the system prior to the equipment installation, and confirm on the jobsite that the equipment adheres to "Lead-Free" regulations.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's data for domestic water piping systems, materials and products.
- B. Submittals shall include but not be limited to the following:
 - 1. Valves
 - 2. Water hammer arresters
 - 3. Piping
 - 4. Pumps

1.03 QUALITY ASSURANCE

- A. Plumbing Code: Comply with applicable portions of New York State Uniform Fire Protection and Building Code, Article 9, Plumbing Requirements, State sanitary code, Department of Health, Division Sanitary Engineering, Bureau of Public Water Supply, any local codes or regulations, and the International Plumbing Code and the International Energy Conservation Code.
- B. All piping valves, hydrants, etc. shall comply with all ASME, ANSI, ASTM, AWWA and NFPA regulations that apply to the work.
- C. Meters, backflow preventers, hydrants, etc. shall conform to local utility company regulations, ordinances and laws, and the International Plumbing Code (IPC).
- D. Obtain all necessary approvals, certificates and arrange for all inspections required by local authorities having jurisdictions. Pay all fees.

- E. Perform water sampling upon completion of all piping systems. Samples to be analyzed by a NYS Dept. of Health approved lab for bacteria as well as all other code required chemical / organic analyses. The plumbing contractor will bear all costs associated with the testing procedures / reports. Test reports shall be included as part of the project closeout documents.

PART 2 - PRODUCTS
(All to comply with the 2015 IPC)

2.01 DOMESTIC WATER PIPING

A. Underground Water

1. 3" or larger: Class 52 ductile iron pipe per AWWA C151, with C104 cement lining, and asphaltic coating inside and out. Fittings shall be cast or ductile iron per AWWA C110, with push-on joints with four serrated silicon bronze wedges at each joint for electrical continuity. Underground type plastic line marker: Provide standard permanent bright colored, continuous-printed plastic tape, intended for direct burial service, not less than 6"wide X 4 mils thick, with lettering "WATER SERVICE".

2. 2" and smaller: Type 'K' copper soldered or brazed.

B. Domestic hot water, cold water and tempered water.

1. Type "L" copper, ASTM B88.
2. Make: Anaconda, or equal by Muller, Revere.
3. Fittings shall be wrought or cast solder type pressure fittings.
4. Chrome plated sponge cleanable brass, sch. 40 for exposed piping.

2.02 BALL VALVES

- A. Description: Bronze body, ball valve with 600 PSI W.O.G. min. rating, teflon seats, stainless ball, blow-out proof stem, viton-o-ring sealed union, removable operating handle and solder ends. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61. ANSI372

2.03 INTERIOR HOSE BIBBS

- A. 'No-Lead', Anti-siphon vacuum breaker wall faucet enclosed in a flush mounting wall box, 3/4" male hose outlet, loose key opens box and faucet operator, chrome plated casting.
- B. Make:
- C. Josam or equivalent. Where indicated, install on cold water piping.

2.04 EXTERIOR WALL HYDRANTS

- A. 'No lead', Automatic draining, freezeless wall hydrant with an anti-siphon vacuum breaker enclosed in a flush mounting wall box. Cast bronze, ¾" male hose outlet, non-freeze, "water" on cover, key handle, proper length galvanized wall sleeve, vacuum breaker, wall clamp, chrome finish.
- B. Where indicated, install on cold water piping.

2.05 SWING CHECK VALVES

- A. General: Construct pressure-containing parts as follows:
 - 1. Bronze valves, 125 or 150 psi: ANSI/ASTM B 62. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61. ANSI 372.
- B. Construct valves with disk seating angle 40° to 45° unless composition disc is specified. Provide stop plug as renewable stop for disc hanger. Construct disc and hanger as separate parts, with disc free to rotate. Support hanger pins on both ends by removable side plugs.
- C. Soldered ends 2" and smaller: Class 125, bronze body, screwed cap, horizontal swing, bronze disc.
- D. Flanged ends 2 1/2" and larger: Class 125, iron body bronze mounted, bolted cap, horizontal swing, cast iron disc.
- E. Manufacturers:
 - 1. Jenkins Bros., A Corp.
 - 2. Kennedy Valve.
 - 3. Lunkenheimer.
 - 4. Stockham Valves and Fittings, Inc.

2.06 SPECIAL VALVES

- A. Balance valve:
 - 1. Bronze/Brass Ball valve with pressure readout ports, calibrated nameplate and memory stop. Bronze materials to be "no lead" type, in conformance with the latest edition of NSF 61.
 - 2. Make: Bell & Gossett model CB, Watts
- B. Trap Primer Valve:
 - 1. 'No lead', Automatic, large port openings, activates on 10 psig pressure drop at 30-250 psig. Water release is factory set. Chrome plated finish.

2.07 THERMOMETERS AND GAGES

- A. Water Pressure Gages: 0-150 psi range, aluminum or brass 4-1/2" case, 1/4" NPT connection. Glass enclosed dial with 1/4" ball valve. 1 percent accuracy, ANSI B40.1, Grade A.
- B. Glass Thermometers
 - 1. General: Die cast aluminum, baked epoxy enamel finish, glass front, 9" long, adjustable joint, locking device. 1 percent accuracy, shock mounted. Copper plated steel or brass stem. Alcohol based thermometers to be used.
 - 2. Range:
 - a. Hot water: 30 to 240°F, 2°F divisions.
 - b. Cold water: 30 to 180°F, 2°F divisions.
 - 3. Thermometer wells: No Lead, Brass or stainless steel, 2" extension for insulated piping. Cap nut with chain fastened to thermometer well.

2.08 PLUMBING INSULATION

- A. General: Comply with Division 15A Section "15180A, Plumbing Insulation".

2.09 UNIONS

- A. Description: "No lead" Cast Brass with Solder Ends. Working pressure: 200 PSI W.O.G.
- B. Make: Nibco, or equal by Mueller, Revere.

2.10 SOLDER AND FLUX

- A. Solder shall be in solid wire form of Type II 95-5 tin antimony solder conforming to ASTM B-32, Grade 5A. Flux shall be a zinc chloride or a mixture of zinc and ammonium chlorides. Solders containing lead shall not be used. 96.5 - 3.5 and 95-5 tin/silver solders may be used.

2.11 SHOCK ARRESTER

- A. Construction:
 - 1. Type 1: Stainless steel body with stainless steel bellows, an air or argon gas cushion and with or without hydraulic displacement fluid.
 - 2. Type 2: "No lead" Hard drawn copper body, polypropylene piston with EPDM O ring seal and brass NPT threaded connection.
 - 3. Contractor may use either Type 1 or Type 2.
- B. Code Compliance: Shock absorbers shall comply with the following codes:
 - 1. P.D.I. - WH201 latest issue.
 - 2. ASSE 1010 latest issue.
- C. Make:
 - 1. Type 1: J.R.Smith 5000 Series.

2. Type 2: Watts LF15M2 -DR Series

PART 3 - EXECUTION

3.01 INSTALLATION OF DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

- A. General: Install the following in accordance with Division 15A Section "Basic Materials and Methods".
1. Identification.
 2. Piping specialties.
 3. Supports, anchors and seals.

3.02 INSTALLATION OF PIPE, TUBE AND FITTINGS

- A. General: Install in accordance with Division 15A Section "Basic materials and Methods".
- B. Install in accordance with recognized industry practices, which will achieve permanently leak proof piping systems. Install each run with minimum joints and couplings. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for pressure piping.
- C. Hose faucets at low points. Cap with hose caps.
- D. Carry headers for groups of fixtures full size through their length.
- E. Swing joints as follows:
1. From water mains to risers.
 2. From riser to branch connections to fixtures.
 3. From riser to mains.

3.03 INSTALLATION OF SHOCK ARRESTORS

- A. General: Upright position, locations and sizes indicated in accordance with PDI Standard WH-201.

3.04 INSTALLATION OF STRAINERS

- A. General: Install full size of pipeline, in accordance with manufacturers installation instructions. Install pipe nipple and shutoff valve in strainer blow down connection, full size of connection, except for strainers 2" and smaller installed ahead of control valves feeding individual terminals. Where indicated, provide drain line from shutoff valve to plumbing drain, full size of blow down connection.
1. Locate plate-type strainer in supply line ahead of the water meter.

3.05 INSTALLATION OF VALVES

- A. General: Install where required for proper operation of piping and equipment, including all branch lines to isolate sections of piping. Locate to be accessible and separate support can be provided.
- B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for

- horizontal plane unless unavoidable.
- C. Insulation: Where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation.
 - D. Drain Valves: Each plumbing equipment item. Located to completely drain equipment for service or repair. Base of each riser, base of each rise or drop in piping system, at all low points, and where indicated or required to completely drain system. Provide hose caps on hose bibbs.
 - E. Check Valves: Horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction of flow.

3.06 INSTALLATION OF SPECIAL VALVES

- A. Balance Valves: Each hot water recirculating loop, and where indicated.
- B. Trap Primer Valves: Install in upright, vertical position in a convenient cold water line where indicated for floor drain primer supply.

3.07 INSTALLATION OF THERMOMETERS AND GAGES

- A. General: Install in accordance with manufacturer's instructions.
- B. Locations: Where indicated on Drawings.

3.08 INSTALLATION OF PLUMBING INSULATION

- A. Install in accordance with Division 15A Section "Plumbing Insulation".

3.09 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Hot and cold water runouts of sizes indicated, no smaller than required by the Plumbing Code.
- B. Mechanical Equipment Connections:
 - 1. Connect hot and cold water piping system to plumbing equipment as indicated.
 - 2. Comply with equipment manufacturer's installation instructions.
 - 3. Provide shutoff valve and union for each connection.
 - 4. Provide drain valve on drain connection.
 - 5. Exposed piping shall be sch. 40 chrome plated brass, sponge cleanable surface.

3.10 WALL HYDRANT AND HOSE BIBB INSTALLATION

- A. Wall hydrant: Install approximately 24" above finished grade or as noted on the plans. Install a stop and drain valve on each wall hydrant branch.
- B. Hose Bibbs for toilet and finished rooms: In rooms where shown with lavatories, install approximately 18" above finished floor under lavatory where indicated. Elsewhere, install 36" above the finished floor where shown. Install stop on branch. Hose bibbs to be furnished with loose key handles.

3.11 WATER SYSTEM DISINFECTION

- A. Scope: All newly installed lines carrying potable water and parts of existing systems which have been altered, extended or repaired prior to use.
- B. Before any use of system is made for domestic purposes, disinfect by one of the following methods as specified in the New York State Uniform Fire Prevention and Building Code. All water samples are to be sent to / tested by a New York State Department of Health approved lab for bacteria analysis. All test results shall be sent to the engineer for review prior to placing the systems in service.
 - 1. The system shall be filled with a water solution containing 50 parts per million of available chlorine and allowed to stand for 24 hours before flushing and returning to service.
 - 2. The system shall be filled with a water solution containing 200 parts per million of available chlorine and allowed to stand one hour before flushing and returning to service.
 - 3. For a potable water storage tank, where it is not practicable to disinfect by the foregoing methods, the entire interior of the tank shall be swabbed with a water solution containing 200 parts per million of available chlorine and allowed to stand for two hours before flushing and returning to service.
- C. Contractor shall provide test kit for residual chlorine.
- D. After contact period flush system with clear water until system tests no more than 0.2 PPM residual chlorine.

3.12 DOMESTIC WATER SYSTEM TEST

- A. Test in accordance with the requirements of Section 15985A - "Plumbing, Testing, Adjusting and Balancing."

3.13 SPARE PARTS

- A. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bib, or faucet installed.

3.14 ADD LEAD TESTING NOTE

- A. Following the completion of the P.C. work scope, the owner shall have the water conditions tested for lead containments by a third-party testing firm to regulation 67.4 of the Department of Health regulations as part of Section 1417 of the Federal Safe Water Act to determine "Lead-Free" compliance and SED guidelines of less than 15 parts per billion.
- B. If the system does not comply with Sub-Part Regulation 67.4 of the DOH Section 1417 of the Federal Safe Water Act, the P.C. shall provide replacements at no additional cost, to then repeat the installation and testing requirements. The P.C. shall absorb the fee for the first lead testing procedure as well as the following confirmation procedures at no additional cost to the owner.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15412A - PLUMBING SANITARY PIPING SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of soil, waste and vent piping system work, is indicated on drawings and schedules, and by requirements of this section.
- B. Applications for soil, waste and vent piping systems include the following:
 - 1. Above ground soil, waste and vent piping within buildings including soil stacks, vent stacks, horizontal branches, traps, and connections to fixtures and drains.
 - 2. Underground building drain piping including mains, branches, traps, connections to fixtures and drains, and connections to stacks, terminating at connection to sanitary sewer, 5'-0" from building wall, or where shown on drawing. Coordinate with site contractor.
- C. Trenching and backfilling is required in conjunction with underground and building drain piping is specified in applicable Division 15A sections, and is included as work of this section.

1.03 QUALITY ASSURANCE

- A. Plumbing code compliance - comply with applicable portions of New York State Uniform Fire Protection and Building Code, especially Article 9, Plumbing Requirements, State Sanitary Code, Department of Health, Division Sanitary Engineering, Bureau of Public Water Supply, any local codes or regulations that apply pertaining to plumbing materials, and the 2015 IPC especially Chapter 7.
- B. ANSI compliance - comply with applicable American National Standards pertaining to products and installation of soil and waste piping systems.
- C. PDI compliance - comply with applicable Plumbing and Drainage Institute Standards pertaining to products and installation of soil and waste piping systems.

1.04 SUBMITTALS

- A. Product data - submit manufacturer's data for soil and waste piping systems materials and products on the following:
 - 1. Pipe and Couplings
 - 2. Clean outs
 - 3. Floor drains
- B. Acceptable Manufacturers

1. Floor Drains
 - a. Jay R. Smith
 - b. Josam
 - c. Zurn
 - d. Watts
2. Couplings for no-hub pipe
 - a. Anaco
 - b. Tyler
3. Soil Pipe
 - a. Eastern Foundry
 - b. Tyler Pipe
 - c. Charlotte Pipe

PART 2 - PRODUCTS
(All to comply with the 2015 IPC)

2.01 SOIL AND WASTE PIPING MATERIALS AND PRODUCTS

- A. General - provide piping materials and factory fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections, provide fittings of materials which match pipe materials used in soil and waste piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.02 BASIC IDENTIFICATION

- A. General - provide identification complying with Specification Section 15057A, in accordance with the following listing:
1. Above ground soil, waste and vent piping - pipe markers.
 2. Underground building drain piping - underground type plastic line markers.

2.03 PIPE

- A. Below Ground:
1. Service weight cast iron with push-on gaskets, hub and spigot. Compression Gaskets shall conform to the requirements of ASTM Standard C564-14 and CISPI310.
- B. Above Ground:
1. Service weight C.I. soil pipe and fittings with no-hub joints. Make: Tyler pipe or equal by Eastern Foundry Co. Anaheim Foundry Co.
 2. Copper drainage tubing, type DWV, shall not be used on site.
 3. Exposed: Sch. 40 chrome plated brass, threaded, sponge cleanable.

2.04 COUPLINGS FOR NO-HUB PIPE

- A. Description: Type 304 stainless steel shield and 3/8" slot head 304 stainless steel screws. All other component metal parts shall be 304 stainless steel. The coupling sealing gasket shall be made of Neoprene as the sole elastomer. A cast iron coupling may be used.

- Do not use under ground. Coupling shall meet or exceed CISPE Standard 310.
- B. Make: Anaheim Co., Tyler Pipe.

2.05 BASIC PIPING SPECIALTIES

- A. General - provide piping specialties complying with Division 15A Basic Materials and Methods section, in accordance with the following listing:
1. Pipe escutcheons.
 2. Mechanical sleeve seals.
 3. Pipe sleeves.

2.06 BASIC SUPPORTS AND ANCHORS

- A. General - provide supports, anchors and seals complying with Division 15A Basic Materials and Methods section "Supports and Anchors".

2.07 CLEANOUTS

A. General

1. Units shall meet all design parameters shown on the drawings.
2. Units shall be complete with all design features and accessories necessary to provide a coordinated installation (such as carpet markers, tile recesses, etc.).
3. Units shall be of the following sizes:
 - a. Line size for piping to 4".
 - b. 4" for piping from 5" to 8".
 - c. 6" for piping 10" and larger.
4. Location:
 - a. At each bend of more than 45 degrees.
 - b. At bottom of soil or waste stacks and rainwater leaders.
 - c. At 50' intervals or less on horizontal pipe lines 4" or smaller.
 - d. At 50' intervals or less horizontal pipe lines 5" or larger.
 - e. At exit of sanitary and storm drains from building.
 - f. Wherever shown on the drawings.
 - g. At the end of each branch line serving more than two fixtures.
5. Placement: must be located where they will be accessible. Check general construction drawings for location of lockers or other equipment which may prevent access.

B. Cleanout Types

1. Deck Plate Cleanout:
 - a. Adjustable cast iron floor cleanout with inside caulk outlet, adjustable ABS housing, clamp device, internal tapered bronze cleanout plug, secured round scoriated nickel alloy cover plate. Jay R. Smith Figure 4020.
2. Wall Plate Cleanout:

- a. Exposed installation: Cast iron 'T' branch cleanout tee with bronze tapered plug. Jay R. Smith Fig. 4510
 - b. Concealed installation behind plaster, dry or masonry walls: Provide cleanout tee with bronze plug tapped for center screw similar to exposed installation with polished vandalproof stainless steel access plate.
3. Cleanout:
- a. Cast iron cleanout with straight body for caulking into soil pipe hub and fitted with bronze plug countersunk or raised head as required.
4. Exterior Cleanout:
- a. Round coated cast iron access frame, heavy duty scoriated (vandalproof), secured cover. Coated cast iron cleanout ferrule with inside caulk connection and recessed tapered thread bronze plug.

2.08 FLOOR DRAINS

- A. Drains and traps shall be same size as waste pipes. Provide clamping devices for drain flashing. Provide P-trap in outlet from each drain, or as shown on drawings.
- B. Drain bodies to be cast iron.
- C. Floor drains shall be by Jay R. Smith, Zurn, Watts or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF BASIC IDENTIFICATION

- A. General - install plumbing identification in accordance with Specification Section 15057A.

3.02 INSTALLATION OF SOIL WASTE AND VENT PIPING

- A. General - install soil and waste piping in accordance with Division 15A Basic Materials and Methods section "Pipe, Tube and Fittings" and with Plumbing Code having jurisdiction.
- B. Solder joints use Type 1 solder.
- C. Insulate vent piping within three feet of passage through roof.

3.03 INSTALLATION DRAINAGE PIPING - SANITARY

- A. Changes in direction long sweep bends or 1/8 and/or 1/16 bends.
- B. Connections of branches to mains with "Y" fittings and 1/8 and/or 1/16 bends.
- C. All connections of horizontal into vertical piping with long turn sanitary "T-Y's".
- D. Grade the "horizontal" piping 1/4" per foot, minimum for 2 1/2 " or less, 1/8" per foot minimum for 3" and larger.

3.04 TURNS AND OFFSETS

A. Turns:

1. From vertical to horizontal:
 - a. Less than 3": Use long sweep or extra-long turn elbow.
 - b. 3" and larger: Use short sweep or 90° short turn fittings.
 - c. Horizontal piping: Use 45° wyes, long sweeps: 1/4, 1/6, 1/8 and 1/16 bends or any combination of same.
 - d. For vents in any direction; Use quarter bends or 90° short turn fittings.

B. Offsets:

1. Make offsets at no less than 45° angle to the horizontal in the following cases:
 - a. Offsets in stack vent portion of soil and waste stacks (above the highest fixture drainage connection).
 - b. Offset in vent stacks.
 - c. Grade the "horizontal" piping 1/4" per foot.
 - d. Connect all plumbing fixtures into sanitary house drain. No case shall soil or waste pass through more than one trap before entering house drain.

3.05 INSTALLATION OF VENT PIPING

- A. Provide vents shown and required by Plumbing Code.
- B. Grade vents to discharge water of condensation.
- C. Make offsets at 45 degree angle.
- D. Connect upper ends of drainage lines to vent system or extend through roof without decreasing size.
- E. Arrange vents and connections except wet vents, so not to carry drainage.
- C. Connect bottom to drains so drainage will wash out rust and scale.
- D. Extend vents above floor line to not less than 6" above flood rim of highest fixture before running horizontally.
- E. Terminate vents 18 inches above roof line.
- F. Increase pipes smaller than 3" to 3" from 18 inches below roof to terminus, using standard length tapered increasers.

3.06 INSTALLATION OF PIPING SPECIALTIES

- A. Install piping specialties in accordance with Division 15A Basic Materials and Methods section.

3.07 INSTALLATION OF SUPPORTS AND ANCHORS

- A. Install supports, anchors and seals in accordance with Division 15A Basic Materials and Methods section.

3.08 INSTALLATION OF DRAINAGE PIPING PRODUCTS

- A. Cleanouts - install in sanitary above ground piping and sanitary building drain piping as indicated, as required by Plumbing Code, and at each change in direction of piping greater than 45 degrees, at minimum intervals of 50' for piping 4" and smaller and 50' for larger piping, and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping.
- B. Flashing flanges - install flashing flange and clamping device with each stack and cleanout passing through waterproof membranes.

3.09 INSTALLATION OF FLOOR DRAINS

- A. General - install floor drains in accordance with manufacturer's written instructions and in locations indicated.
- B. Coordinate with soil and waste piping as necessary to interface floor drains with drainage piping systems.
- C. Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.
- D. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.
- E. Position drains so that they are accessible and easy to maintain.

3.10 FLASHING

A. General

- 1. Flash openings with 6 lb. copper flashing.
- 2. Make watertight, allow for expansion and contraction.

B. Vent pipes

- 1. Extend not less than 12" from base of pipe.
- 2. Turn flashing over edge on cast iron; extend into same one (1) inch.
- 3. Ream coupling screw down over flashing at least one (1) inch screwed pipe.
- 4. Copper flashing assembly acceptable.

- C. Waterproof pipes through waterproof walls or floors: See details on drawings.

3.11 EQUIPMENT CONNECTIONS

- A. Piping runouts to fixtures - provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, but in no case smaller than required by Plumbing Code. Traps and tailpieces shall be chrome plated brass. Waste stubs out of wall (exposed) shall be sch. 40 threaded chrome plated brass. All exposed surfaces shall be sponge cleanable.

3.12 INSPECTION AND TEST

- A. New drainage piping shall be subjected to hydrostatic pressure test, see requirements in Section 15985, "Plumbing Testing, Adjusting and Balancing".

3.13 PROTECTION

- A. Protect drains during remainder of construction period, to avoid clogging with construction materials and debris and to prevent damage from traffic and construction work.

END OF SECTION

DIVISION 15A - PLUMBING

SECTION 15985A - PLUMBING, TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of testing, adjusting and balancing work is indicated by requirements of this section, and also by drawings and schedules.
- B. Component types of testing, adjusting and balancing specified in this section includes the following:
 - 1. Rough sanitary and storm piping.
 - 2. Water supply system.
 - 3. Gas system - Refer to 15488A

1.03 QUALITY ASSURANCE

- A. Installer - a firm with at least 3 years of successful testing, adjusting and balancing experience on projects with testing and balancing requirements similar to those required for this project.

1.04 REQUIREMENTS

- A. No system shall be covered or concealed until tested, approved.
- B. Pay for Permit and Inspection Fees required by Authority having jurisdiction.
- C. Test in presence of Owner's Representative and Plumbing Inspector.
- D. Prove tight for period stated or longer if required.
- E. Tests may be made in sections.

1.05 CODES AND REQUIREMENTS

- A. Comply with latest editions and applicable portions of International Plumbing Code, Local Plumbing Standards, New York State Building Code, especially Article 9, Plumbing Requirements and Plumbing Code.
- B. Comply with applicable portions of Standards for Waste Treatment Works, New York State.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide test equipment and materials necessary for tests.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable.
- B. Test, adjust and balance systems and components as indicated, in accordance with procedures outlined below and in applicable standards. Test which follows shall be considered minimum standards.

3.02 TESTS & INSPECTIONS TO BE

- A. Rough Sanitary and Storm Piping.
 - 1. Stop openings, fill with water to top of highest vent. Water shall hold constant for two (2) hours.
 - 2. May be tested in sections using water pressure test.
 - 3. Test pressure shall be equal to at least 10 ft. water column at all points.
 - 4. Retest at least upper 10 ft. of next lower section.
 - 5. Compliance with the Department of Health Lead in Water Regulation is located on Drawings.
- B. Water Supply System.
 - 1. Fill, subject to 125 psig hydrostatic pressure at lowest level for two (2) hours.
 - 2. Fixtures shall not be connected into system during test.
 - 3. After fixtures are connected, test system for two (2) hours, at 75 PSIG or prevailing water pressure, whichever is higher.
 - 4. Regulate flow of water to each fixture.
 - 5. Adjust balancing valves on hot water system.
 - 6. Faucets, flush valves shall operate satisfactorily without waste of water, without objectionable noise.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16010 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL

- A. Applicable provisions of the Conditions of the Contract shall govern the work of Division 16 and its related sections.
- B. Intent:
 - 1. The drawings and specifications are intended to provide for a complete and ready for operation electrical installation. However, both the drawings and specifications are for the Division 16 Contractor's guidance and are not intended to give every detail of the existing conditions or new installations nor do they describe every fitting required for the installation of the work. The Division 16 Contractor shall furnish, install, and place in workmanlike manner all equipment, accessories, supports, fittings, and all other material needed for the complete electrical installation. The Division 16 Contractor shall prepare such additional drawings as necessary or required for any purpose and shall submit them for the approval of the Engineer.
 - 2. Before submitting his proposal, the Division 16 Contractor shall be fully informed to the extent, character, and intent of the work to be done by him. No consideration will be granted for any misunderstanding of the material to be furnished or work to be performed. See also the applicable sections of the Conditions of the Contract.
- C. Verifying Existing Conditions:
 - 1. The Division 16 Contractor, before submitting his bid, shall examine the site to which this work is in any way dependent upon according to the intent of these specifications and accompanying drawings. He shall report to the Engineer, in writing, with his bid, any conditions which prevent him from performing his work. No "Waiver of Responsibility" for inadequate, incomplete, or defective work will be considered by the Engineer unless writing notice had been filed by the Division 16 Contractor with his bid.
- D. Cooperation:
 - 1. The work called for in this Specification and indicated on the accompanying drawings shall be carried on in conjunction with the continued operation of the building and shall be so arranged that its installation and operation will conform with and facilitate the early installation of the work.

2. The Division 16 Contractor shall bear the expense required to revise his work due to any failure to coordinate the installation of his work with that of the buildings operation.
3. The Division 16 Contractor shall be responsible for the distribution and information concerning his work as required for the prompt installation. The Division 16 Contractor will be held fully responsible for any delay in the work as to any information, etc. regarding his work as required. See also the applicable sections of the Conditions of the Contract.

E. Accessibility and Clearances:

1. The Division 16 Contractor shall inform himself fully regarding peculiarities and limitations of space for the installation the materials and equipment under Division 16. He shall verify all dimensions and conditions in the field and from rough-in drawings of the equipment manufacturer. No extra compensation will be allowed because of differences between actual dimensions and the sizes shown on the drawings.
2. The Division 16 Contractor shall see that all his equipment such as apparatus necessary to be reached from time-to-time for operation and maintenance are made easily accessible. All work shall be checked for interferences with beams, ducts, pipes, etc. prior to installation of any equipment.
3. Although the location of equipment may be shown on the drawings in a specific place, the construction of the building may disclose the fact that the location for this work does not make its position easily and quickly accessible. In such case, the Division 16 Contractor shall call the Engineer's attention to same before installing the work and shall be guided by the Engineer's instruction.

F. Protection of the Work:

1. The Division 16 Contractor shall effectively protect, at his expense, all materials and equipment, including his employees, during the period of construction and he shall be held responsible for all damage done to his work, until the same is fully accepted by the Architect. See also the applicable sections of the Conditions of the Contract.
2. The Division 16 Contractor shall exercise particular care insuring that work in progress, and notably switchgear, shall not become wet from condensation or water for any source. Further, he shall protect work in progress from contamination, overspray, or other damage from other trades, including his own. All traces of such events shall be removed, remedied, or otherwise corrected to turn over the electrical system to the Owner in new condition.

G. Shop Drawings:

1. For Shop Drawing requirements, see the applicable sections of the Conditions of the Contract. In addition, The Division 16 Contractor shall submit all shop drawings within 30 days of signing Contract. Generally, all equipment and materials of the same classification, type, or kind shall be submitted at one time in a bound brochure. All shall include a minimum of special shop drawings and shall be accomplished by a written detailed sequence of operation together with schematic wiring diagrams which shall show the functions, facilities, operation, and inter-connections of the equipment. Shop drawing submission not including this information will not be considered. Any construction delays caused by failure to submit shop drawings on time or in the proper format shall be the responsibility of the Division 16 Contractor.

H. Guarantee:

1. For guarantee requirements, see the applicable section of the Conditions of the Contract.

1.02 SPECIAL CONDITIONS

- A. This Contractor, as well as subcontractors for his work, must carefully read the "Instructions to Bidder" and study the plans and specifications.
- B. It is the intention of these specifications and the drawings accompanying same that they shall provide for the furnishing and installing of the indicated items complete as specified and as shown. Any work on the drawings, particularly described in these specifications, or vice versa, or any work or change which may be evidently necessary to complete the installation shall be furnished by the Contractor as being included in this Contract.
- C. During the course of the work, should any ambiguities or discrepancies be found on the drawings or in the specification, to which the Contractor has failed call attention before submission of his bid, than the Engineer shall interpret the intent of the drawings and specifications, and the Contractor hereby agrees to abide by the Engineer's interpretation and agrees to carry out the work in accordance with the decision of the Engineer. It is expressly stipulated that neither the drawings nor the specifications shall take precedence, one over the other, and it is further stipulated that the Engineer may interpret or construe the drawings and specifications of the work, and of that question, the Engineer shall be the sole judge.
- D. This Contractor shall provide and erect all sheds for the storage of his materials and provide temporary office for plans, details, records, etc. He shall furnish all scaffolding and equipment required for the installation of his work.
- E. Where no specified kind or quality of material is given, a first class standard article as approved by the Engineer shall be

furnished. The drawings and specifications do not undertake to illustrate or set every item necessary for the work, as it is assumed that the Contractor is expert in the several lines of the work and is capable of interpreting them.

- F. Small details not usually shown or specified but necessary for a proper installation and finishing shall be included in the Contractor's estimate, the same as if hereby specified or shown.
- G. This Contractor assumes the responsibility to fit his equipment into every space regardless of discrepancies in the plans and/or specifications unless he notified the Engineer in writing, prior to the acceptance of his bid, of these discrepancies.

1.03 WORK INCLUDED

- A. These specifications and the accompanying drawings are intended to include the furnishings of all labor, materials, tools, hoists, transportation, equipment apparatus, and all required appurtenances and incidental auxiliaries necessary for the installation of the electrical work in a safe, substantial, workmanlike manner, complete in every detail, tested, programmed and ready for satisfactory operation.
- B. Any equipment called for in these specifications and not shown on the drawings and vice versa shall be furnished and installed complete as would any equipment both specified and shown. Generally, the work under Division 16 shall include, but shall not necessarily be limited to, the following items. Omission of specific items shall not be construed as being omitted from Division 16.

1.04 CODES, PERMITS, AND CERTIFICATES

- A. All work, material, and equipment under Division 16 shall comply with the current applicable requirements of an approved electrical construction agency serving the locale of the project, the service utility company, all State and Municipal agencies having jurisdiction, and to the editions of the National Electrical Code / NFPA 70. This article supercedes any references to the New York Board of Fire Underwriters that may be found in project documents or drawings.
- B. Before submitting his bid, the Division 16 Contractor shall familiarize himself with the rules of all herein before mentioned Boards, Departments, Agencies, etc. having jurisdiction, and he shall notify the Engineer with his bid, if in his opinion any work or materials specified is contrary to any such rules. Otherwise, the Division 16 Contractor shall be responsible for the approval of all work or materials and in case the use of any material specified is not permitted, a substitute approved by the authorities and by the Engineer shall be furnished and installed without additional cost to the Owner.
- C. The Division 16 Contractor shall procure and pay for all necessary drawings, permits, and certificates required by the various governing agencies having jurisdiction and shall turn

over to the Engineer all permits for construction before starting work and certificates of test, inspection, and approval before requesting payment.

1.05 TESTS

- A. All tests required by the National Electrical Code, approved Electrical Inspection Agencies, State and Local Authorities, the servicing Utility Company, and the Engineer shall be executed by or paid for by the Division 16 Contractor. Furnish all labor, material, and instruments for each test. All major tests shall be witnessed by the Engineer and/or the Authority having jurisdiction, all of whom shall be given a minimum of one week's written notice prior to such tests.
- B. During the course of work and prior to final acceptance, all such tests shall be made as specified above and as to the Engineer deems necessary to insure that the Electrical Work meets with the intent of these specifications and is approved by the Authority having jurisdiction. Should the tests show that any of the material, apparatus, or workmanship is not first class or not in compliance with these requirements, the Division 16 Contractor, on notice from the Engineer shall remove same and promptly replace them with other materials and apparatus in conformity to the requirements.
- C. All circuit work, throughout, on all systems shall be tested for grounds and short circuits, prior to being energized, and all work shall be left in first class operating condition when energized. All other tests shall be as specified above and/or specified elsewhere herein.
- D. Tests of electrical work shall be made as equipment is installed.

1.06 DEMONSTRATION OF THE COMPLETED ELECTRICAL WORK

- A. Instruction Demonstration:
 - 1. The Division 16 Contractor shall be fully responsible for the instructing of the Owner's designated personnel in the operation and maintenance of the all equipment furnished by him. All costs required for such instruction and demonstration shall be paid for by the Division 16 Contractor. Such instruction shall take place in the presence of the Engineer's representative, upon completion of the work, when the Division 16 Contractor and his equipment manufacturers and/or vendors shall arrange a demonstration of all electrical systems and equipment for the Owner's design representatives and shall furnish for their use, Engineer approved, printed and bound copies of all operation and maintenance construction manuals. Included in these manuals shall be one (1) copy of all previously submitted and Engineer "Approved" or "Approved as Noted" shop drawings ("Approved as Noted" shop drawings must first be permanently corrected). Informal or non-Engineer witnessed instructions or instructions to non-

designed Owner personnel shall not be recognized as fulfilling these requirements.

B. Final:

1. The Division 16 Contractor shall, before payment is received, clean the installed electrical equipment; he shall assure that all guarantees and record drawings, have been prepared and approved; that all instructions have been given and that all demonstrations have taken place.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16060 - GROUNDING AND BONDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Grounding clamps & connectors
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- D. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 QUALITY ASSURANCE

- A. 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.
 - 1. Comply with UL 467.

- B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burndy Corp.
 - 2. Cadweld Div.; Erico Product, Inc.
 - 3. Ideal Industries, Inc.
 - 4. Joslyn Corp.
 - 5. OZ Gediney Div.; General Signal Corp.
 - 6. Thomas and Betts Corp.

2.02 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."
- B. Material: Aluminum, copper-clad aluminum, and copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Grounding Electrode Conductors: Stranded cable.
- E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- F. Bare Copper Conductors: Comply with the following:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Assembly of Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
- G. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.03 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.04 GROUNDING ELECTRODES

- A. Ground Rods: Pointed, Copper-clad steel.
 - 1. Size: 3/4 x 120 inches
- B. Test Wells: Provide handholes as specified in Division 2 Section "Underground Ducts and Utility Structures."

PART 3 - EXECUTION

3.01 APPLICATION

- A. In raceways, use insulated equipment grounding conductors.
- B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- D. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.
- E. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

3.02 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
- C. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

- D. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- E. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.
- F. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6.4-by-50-by-300-mm) grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- G. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

3.03 INSTALLATION

- A. Ground Rods: Install ground rods per NEC and utility requirements.
 - 1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds. Make connections without exposing steel or damaging copper coating.
 - 3. Ground rods shall be installed in undisturbed earth.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.
- G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- H. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.

3.04 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.05 GRADING AND PLANTING

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16100 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL

A. Standards for Materials and Workmanship:

1. All materials and workmanship shall, at a minimum be in accordance with (in no order of precedence):
 - a. National Electric Code (NFPA 70) - latest edition as adopted by the Authority Having Jurisdiction, unless otherwise noted.
 - b. State and municipal Building Codes and related subcodes.
 - c. Occupational and Safety Act (OSHA) Requirements.
 - d. Rules and Regulations of the Authority Having Jurisdiction applicable to the work.
 - e. National Electrical Standards Association Standard for Good Workmanship in Electrical Construction (NECA-1)
 - f. Serving utility's rules and regulations for providing service.
 - g. Contract Drawings and Specifications.
 - h. Manufacturer recommended installation instructions, practices and procedures for the products being utilized or installed.

Where conflicts arise between the above, the more stringent requirement shall be adhered to.

2. Except where existing materials and equipment are called for to be reused, all materials and equipment furnished and installed under Division 16 shall be new, of standard first grade quality, and correctly designed for their specific purpose. All new materials and equipment shall conform to the standards of and be listed/labeled by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories (UL) and shall be approved for use by all local authorities having jurisdiction.
3. All equipment and material furnished shall be the manufacturer's standard item of production unless specifically specified or required to be modified to suit job conditions. Size material; finish dimensions, and the capacities for the specified application shall be published in catalogs for national distribution by the manufacturer. Ratings and capacities shall be certified by a recognized American rating bureau.
4. Equipment and material fabricated specifically for use on this project shall be in strict accordance with the Drawings and Specifications and shall conform to the latest

standards of the National Electric Manufacturer's Association.

5. All materials and equipment of one and the same kind, type, or classification and used for identical purpose shall be made by the same manufacturer.
6. All equipment and materials to be installed under Division 16 shall be done so in a workmanlike manner in accordance with recognized workmanship standards and shall present a neat and professional appearance when completed. Any workmanship considered by the Engineer as being faulty or as not being first class shall be removed and replaced by the Division 16 Contractor to the satisfaction of the Engineer at no additional cost to this Owner.
7. Within 30 days of Contract signing and prior to the submission of shop drawings or the purchase of any material or equipment, the Division 16 Contractor shall submit to the Engineer a detailed list of all items of materials and equipment, which he proposes to furnish under Division 16. Such a list shall bear the equipment manufacturer's name, general description or series catalog number, and intended location or use of same. In addition, furnish a list of distributors who will be providing equipment for this project.
8. Where particular products or materials are specified hereinafter by manufacturer's name, they shall be considered as the standard and as most satisfactory for their purpose of use on the site or in the building. Another manufacturer's product other than those indicated may be submitted for substitution with the understanding that the Engineer shall be the sole judge as to the acceptability of the substituted items. In addition, furnish to the Engineer or Owner upon request, and within 14 days of such a request, samples of any Base Bid and/or corresponding Alternate Bid or intended substitute equipment, fixtures, etc. for their comparison and selection.

1.02 CUTTING AND PATCHING AND REPAIR

A. General

1. The Division 16 Contractor shall be responsible for the removal and replacement of existing ceiling, wall and flooring systems as required to perform the work, unless otherwise noted. Prior to disturbing the area, notify the Owner of any pre-existing damaged, stained, degraded finish materials or areas, such that pre-existing conditions can be documented and for Owner option to provide replacements for re-installation.
2. When applicable to project conditions, removal of existing hung ceilings shall be done with care and stored in a

controlled location for future reinstallation under this Contract. Any ceiling tile damaged as a result of this work shall be replaced by the Division 16 Contractor (at no additional cost to the Owner).

3. All cutting required to facilitate the proper installation of all work to be installed under Division 16 shall be done by the Division 16 Contractor. All cutting shall be done in the manner specified and/or directed and approved by the engineer and only after permission of the Engineer is obtained. The installation of sleeves, chases, etc. in concrete walls, floors, ceilings, and roofs as well as the cutting of existing concrete walls, floors, ceilings, and roofs shall be done by core drilling. All patching will be the responsibility of this Contractor.
4. Any penetrations through fire rated areas shall be accomplished using 3M or Hilti fire barrier products in sheets, strips, or caulk (i.e., USG Fire Stop System (that meets ASTM, UL, and FM standards.
5. Where the Division 16 Contractor's demolition, relocation or replacement activities result in bare areas remaining exposed, the Division 16 Contractor shall be responsible to patch, prime and paint, or otherwise repair the exposed areas as required to match the adjacent areas. Remove unused anchors and fasteners and patch appropriately. Prime and paint as required to match the adjacent area.
6. All costs for the above shall be included in bid price.

1.03 WATERPROOFING

- A. Wherever any of the work of Division 16 has to pierce any waterproofing, this work shall be done by the Division 16 Contractor with care and after the part of these systems have been put in place through this waterproofing, the opening made by same shall be waterproofed and made absolutely water-tight as approved by the Architect and/or as hereinafter specified.
- B. Conduits piercing the cement waterproofing of wall and floors shall be provided with waterproof conduit entrance seal sleeves around same. These sleeves shall be Type "WSK" (walls) or "FSK" (floors) as manufactured by O-Z or other approved.
- C. Conduit sleeves through non-waterproofed walls and floors shall be grouted, caulked with oakum, and sealed with approved semi-plastic mastic compound on both sides of the wall.

1.04 CONDUIT, RIGID AND FLEXIBLE

- A. All conduits installed on the site or in the building shall be of the highest quality, free from defects, and listed by a NRTL and bear the manufacturer's mark or stamp. The Division 16 Contractor shall check the details of other Division and also the various Vendors' and Manufacturers' approved layouts for the exact

locations of all equipment, motors, etc. and shall terminate his conduit turns as shown thereon and as directed.

1. Thin Wall Steel Electrical Metallic Tubing, EMT (galvanized inside and outside).
 - a. All areas where conduit is concealed in walls or hung ceilings and allowed by Code.
 - b. All areas where conduit is exposed on walls or ceilings and allowed by Code. (Except otherwise noted on drawings).
2. Flexible Metal Clad Cable, MC (galvanized steel inside and outside).
 - a. Run concealed in ceiling and non-masonry partitions as indicated by the special symbol and for the particular wiring systems indicated on the drawings. Provide conduit sleeves or junction box conversion to pipe and wire for extension of these runs from ceilings into masonry partitions for switch legs and similar case. In no case shall MC be permitted for wiring sizes larger than No. 10 AWG or quantities greater than four (4) conductors in a single armored cable, furnish and install a flexible steel conduit (Greenfield) with the required number of conductors for that particular armored cable run in order to comply with the requirements for this paragraph and NEC Codes.
 - b. **Use of aluminum clad MC Cable is disallowed.**

B. The Drawings indicate the general location of conduit runs which may be modified at the time of installation to adapt same to building construction or site configuration but in no case shall circuits be combined without permission from the Engineer. Minimum size conduit for rigid steel, thin wall steel, flexible steel, or rigid **non-metallic conduit shall be ¾-inch** unless indicated otherwise on the Drawings. All rigid steel, thin wall steel, and rigid non-metallic conduit corners shall be turned with standard elbows or long radius bends. For all sizes of conduit larger than one inch, use standard manufactured elbows and offsets made for this purpose. For one inch and smaller sizes, the Division 16 Contractor will be permitted to make bends, but care must be taken not to damage the conduit. The radius of the inner curve on any bend shall be not less than allowed by Code. No more than four (4) right angle bends shall be permitted in any conduit run between any two (2) terminations or pull boxes.

C. The ends of all conduits shall be carefully reamed before installation and after the application of the dies and shall be free from burrs and sharp edges. Where it becomes necessary to cut a length of conduit, it shall be done with a hacksaw or other approved cutter and care shall be taken to secure a straight end on all conduits so that all conduit joints can and

will be brought to a shoulder. In installing all conduits, particular care must be taken in cutting to the proper length so that the ends will fit exactly into the outlet boxes and cabinets. Where conduits terminate in cabinets, they shall be neatly arranged. The ends of all conduits shall be immediately temporarily plugged after installation with plugs similar to T & B Series 1471, size as required, so as to avoid the conduit filling with earth, mortar, dust, etc.

- D. All conduits shall be furnished complete with all required size associated or elsewhere herein under Grounding. Joints in rigid steel conduit shall be made with threaded type steel coupling made up with Thomas and Betts Krop-Shield compound. Terminations of rigid steel conduit shall be made with double steel locknuts and insulated galvanized steel grounding type bushing, Thomas & Betts Series 3800 or other approved made with the threading compound specified above where required. Running threads on rigid conduit shall not be permitted; therefore, where straight threads cannot be used, approved type unions shall be installed. Joints in thin wall steel conduit shall be made with steel compression type couplings and connectors. Terminations of thin wall steel conduit shall be made with a single steel locknut, a compressions type steel connector and an insulated galvanized steel grounding type bushing, Thomas & Betts Series 5100 and Series 3800 or other approved. All fittings for flexible steel conduits and flexible armored cables shall be of the standard steel set screw and single locknut type or of the steel double locknut 'O' ring type and shall be approved for grounding purposes by the Local Inspector. Fittings for rigid non-metallic conduit shall be of non-metallic thread type and/or of the non-metallic solvent weld type. Where required, provide cast or installed above grade or within building(s). The ends of conduits terminating at motors, starters, and similar apparatus and devices shall be furnished with fittings as specified above and suitably required in each case. Provide expansion fittings on all conduits passing through or crossing building expansion joints. Expansion fittings for steel, conduits shall be OZ Catalog No. "DX (rigid) and TX (thin wall) or other approved. Expansion fittings for non-metallic conduits shall be of the 'O' ring non-metallic expansion coupling type as manufactured by Carlon or other approved. Care shall be taken to secure a straight end on all conduits so that all conduit joints can and will be brought to a shoulder. In installing all conduits, proper care must be taken in cutting to the proper length so that the ends will fit exactly into the outlet boxes and cabinets. Where conduits terminate in cabinets, they shall be neatly arranged. The ends of all conduits shall be immediately temporarily plugged after installation with plugs similar to T & B Series 1471, size as required, so as to avoid the conduit filling with earth, mortar, dust, etc.
- E. All conduits shall be furnished complete with all required size and associated fittings. Joints in rigid steel conduit shall be made with threaded type steel coupling made up with Thomas & Betts Krop-Shield compound. Terminations of rigid steel conduit shall be made with double steel locknuts and insulated galvanized steel ground type bushing, Thomas & Betts Series 3800 or

otherwise approved made up with the threading compound specified above where required. Running threads on rigid conduit will not be permitted; therefore, where straight threads cannot be used, approved type unions shall be made with steel compression type couplings and connectors. Terminations of thin wall steel conduit shall be made with a single steel locknut, a compression type steel connector and an insulated galvanized steel grounding type bushing, Thomas & Betts Series 5100 and Series 3800 or other approved. All fittings for flexible steel conduits and flexible armored cables shall be of standard steel set screw and single locknut type or of the steel double locknut 'O' ring type and shall be approved for grounding purposes by the Local Inspector. Fittings for rigid non-metallic conduit shall be of the non-metallic thread type and/or of the non-metallic solvent weld type. Where, required, provide cast non-metallic support fittings for all rigid non-metallic conduits installed above grade or within building. The ends of the conduits terminating at motor, starters, and similar apparatus and devices shall be furnished with fittings as specified above and as suitably required in each case. Provide expansion fittings on all conduits passing through or crossing building expansion joints. Expansion fittings for steel, conduit shall be OZ Catalog No. "DX" (rigid) and "TX" (thin wall) or other approved. Expansion fittings for non-metallic conduits shall be of the 'O' ring non-metallic expansion coupling type as manufactured by Carlon or other approved.

- F. The conduits for all branch circuit and feeder wiring shall be run concealed except in machine rooms, boiler rooms, equipment rooms, and similar space; where indicated or specified otherwise; where the lack of a hung ceiling and the presence of mechanical equipment and ducts makes a concealed installation from the slab impossible or impractical; where permission is granted by the Engineer to run exposed. Exposed conduits shall run parallel to walls and ceilings using hot dipped galvanized conduits, fittings, or pull boxes for taps and direction changes. All exposed conduits must be securely fastened in place by means of substantial galvanized supports and fasteners. Where conduits are to be fastened to masonry walls, ceilings, or partitions, the use of wooden plugs will not be permitted; provide malleable iron pipe clips with screws and expansion sleeves. Banks of conduits shall be supported from Unistrut trapeze hangers fastened to structural member by rods. The arrangement and method of fastening all conduits shall be subject to the direction and approval of the Architect and shall be supported free from outlets, pull boxes, etc. No "Hit On" clamps or squeeze connections shall be accepted. All fittings shall be nut and bolt connected.

1.05 WIRE AND CABLE

- A. Furnish and install all wire and cable for receptacles, equipment, panels, etc. for a complete wiring system as indicated on the Drawings and as required and specified.
- B. All wire and cable shall be new, manufactured of soft drawn copper of not less than 98% conductivity, conforming to ASTM

specifications and the latest requirements of N.E.C. Wire, and cable shall have 600 volt insulation (unless otherwise noted or specified) of the type specified and shall be of the standard AWG sizes as called for on drawings or specified. All wire and cable shall be delivered to the site or the building(s) in their original unbroken packages or reels plainly marked or tagged as follows:

1. Underwriters' labels and words "National Electrical Code Standard."
 2. Size, code type, insulation, and maximum working voltage of the wire.
 3. Name of manufacturing company and the trade name of the wire.
 4. Date of manufacture (month and year) which shall be within eight (8) months of installation.
- C. 600 volt class wire and cable shall be as manufactured by American Insulated Wire, Triangle, General Cable, or Anaconda. High voltage cables, 5,000 volts and above shall be as specified by the local electric utility and as may be further specified by the engineer when such specification section is included in this project manual.
- D. Wire and cable insulation shall be as follows and, in all cases, the insulation shall be suitable for the operating temperature of the equipment served.
1. No. 12 AWG and larger, dry locations: **THHN**.
 2. No. 12 AWG and larger, wet location in conduit direct bury or in conduit in concrete slabs on earth: **THHW**.
 3. For service conductors serving local utility equipment and all service related CT cabinet, disconnectors and or main distribution center: **XHHW** or **USE**.
 4. For continuous runs in fluorescent fixtures listed as a raceway or installed in non-plenum spaces: **RHH**, or **THHN**.
 5. For recessed outdoor lighting fixtures: **XHHW** (to junction box in hung ceiling).
 6. For recessed indoor lighting fixtures: **AF** or **THHN** (to junction box in hung ceiling).
 7. Areas of high ambient temperature (i.e., boiler rooms, auxiliary heater rooms, etc.): **RHH**.
 8. Within 3 feet of boilers, heater, etc.: **AVA**.
 9. Special systems (fire alarm, sound, etc.): Size and insulation as specified and/or indicated on the Drawings for each special system. All such wiring shall be plenum rated.

10. Pendants and flexible cords: SJ or SJO (both with ground wire).
11. Other wire and cables: All other wire and cable shall be as indicated on the Drawings or as required by the particular equipment manufacturer or Utility Company.
- E. Unless otherwise noted or indicated all light and power wiring shall be #12 AWG size: light and power wiring home runs shall be #10 AWG if longer than 100 feet measured between the local switch and the panelboard or the nearest outlet and the Panelboard. All cable #8 AWG and larger shall be stranded: all wire #10 AWG and smaller shall be solid.
- F. All wire and cable #6 AWG and small shall be factory color coded. Cables #4 AWG and larger shall be field color coded utilizing colored pressure sensitive tape at switchboards, panelboards, pullboxes, junction boxes, outlet boxes, and equipment served. Colors for each phase and neutral shall be consistent throughout the system. Where two or more neutrals are run in any one conduit, each neutral shall be taped to associated line conductors in each outlet. Neutrals and/or ground may not be combined and shall be installed continuous to panelboards, switchboard, etc. Each circuit on the drawings has been given a reference number. Connections at Panelboard, distribution equipment, etc., shall be that no neutral wire or cable shall serve more than one branch circuit wire or cable from the same phase. Color code, where not otherwise required by the inspection authorities, shall be as follows (where multiple circuits are run in a single conduit, additional color sequence shall be provided as approved):

	<u>120/208V</u>	<u>277/480v</u>
Phase A	Blue	Brown
Phase B	Black	Orange
Phase C	Red	Yellow
Neutral	White	White or Gray
Traveler or Switch Leg	Black with red colored stripe	Black with red colored stripe
Ground	Green	Green

- G. All polyphase installations shall be phase rotation checked before and after work conduct to assure connect rotation or maintenance of existing rotation, as suitable. Verify correct phase rotation prior to activating any 3-phase device.

1.06 WIRE AND CABLE CONNECTIONS AND DEVICES

- A. Feeder circuit cables shall be continuous from distribution equipment, etc. to panel, etc. served. Splicing and intermediate

pull boxes and manholes will not be permitted without the written permission of the Engineer. Branch circuit wiring shall be continuous except splices will be permitted at outlets, junction boxes, etc. six hundred volt, solderless mechanical splicing devices, as hereinafter specified, shall be used for splicing joints, taps, and connections of 600 volt wire and cables used for feeder and branch circuit wiring. The same devices shall be used for splicing joints, taps, and connections of sound, fire alarm, and other special system wire and cables except at terminal strip cabinets, sound racks, etc. where such connections shall be made with the terminal strips specified with the strip cabinets, etc. Wire nuts or crimp-on connectors shall not be permitted for splicing. Sufficient slack wire and cable shall be left for all outlets, distribution equipment, panelboards, controllers, amplifiers, control panels, etc. to facilitate connections to device or equipment served without putting a strain on the wire or cable. For wire #8 AWG and smaller, use steel spring solderless connectors with semi-rigid insulating shell taped with vinyl Scotch #88 tape (Scotch brand "Scotchlok" Types "Y", "R", and "B" as required or other approved). For cable #6 AWG and larger, use heavy duty Hy-press Barrel crimping tubes, (Thomas & Betts, Burndy, O.Z., or other approved). All connections shall be insulated with 3m type cold shrinks or other approved heat shrinks. The method used must provide insulation equivalent to 150% of the conductor's insulation. Other devices used for splicing other special wires and cables shall not be as specified elsewhere herein. **Use of split bolt connectors (bug nuts) is disallowed.**

- B. All wires and cables within all panelboards, distribution equipment control panels, terminal strip cabinets, pullboxes, junction boxes, outlets, and other equipment shall be neatly laced and bound in an orderly, workmanlike manner with Thomas & Betts Ty-rap and identified using Thomas & Betts E2 code self-laminating type Series WSL vinyl wire markers.
- C. No wires or cables shall be installed in conduits until conduits are free from condensate, moisture, and/or water. The only permissible wire pulling lubricant is Ideal Industries "Yellow 77."
- D. All circuits, regardless of being in conduit of any type, shall contain a bond wire. Use of (metallic) conduit as a bond is disallowed.

1.07 OUTLET BOXES

- A. Furnish and install an outlet box for each and every outlet, device fixture, etc. called for on the drawings, specified and required by Code. Outlet boxes shall be approved design, construction, form and dimension suitable for its specific location, the kind of wiring device, fixture, etc. to be used, the number of wires contained, and the arrangement type conduit and/or raceway they are connected to.
- B. Unless noted otherwise, hereinafter **all** outlet boxes shall be galvanized or sherardized pressed steel boxes. Outlet boxes for surface raceways shall be galvanized steel prime painted boxes

and shall be compatible with the size and type surface raceway used.

- C. All outlet boxes shall be a minimum of 4" square or round by 1 ½" deep unless indicated otherwise on the drawings and unless a local condition requires a small box (metal and glass partition work, etc.). Use deeper boxes where required by the number of wires, splices, bushings, special fixture, wiring devices, and as specified hereinbefore.
- D. Pressed steel boxes and accessories shall be as manufactured by Thomas & Betts, Steel City, or National Electric. Outlet boxes and accessories for surface raceways shall be as manufactured by Panduit, Wiremold, National Electric, Hubble, or other approved.

1.08 PULL AND JUNCTION BOXES

- A. Furnish and install all pull boxes and junction boxes in the various electrical conduit systems where specified, where indicated on the drawings, and wherever required to facilitate the proper installation of the wires and cables.
- B. Junction boxes shall meet all the requirements of and be installed in a manner identical to that specified elsewhere herein for outlet boxes except: 1) that with the exception of junction boxes used for surface raceways, generally all junction boxes shall be installed only in unfinished areas or behind lay-in ceilings where they shall be accessible (whether junction boxes are installed in finished areas or unfinished areas they shall be flush mounted in masonry or non-masonry walls except in machine rooms, equipment rooms, and boiler masonry walls where they may be surface mounted cast boxes or non-metallic boxes as specified for outlet boxes); 2) that minimum size pressed steel junction box shall not be less than 4 11/16" square by 2 1/8" deep. 3) and that all pressed steel junction boxes shall be provided with blank aluminum cover plates having an anodized finish similar to those specified under Wiring Devices (except pressed steel boxes above hung ceilings which shall be provided with flat galvanized or sherardized steel plates). Special junction boxes shall be in accordance with these specifications and as specified elsewhere herein or on the drawings.
- C. Pullboxes shall be constructed of standard type and size code gauge boxes and covers and shall be employed where practical unless specified otherwise. Pullboxes other than standard (for both steel and non-metallic conduit systems) shall be constructed of not less than 12 gauge galvanized sheet steel with suitable angle iron reinforcing frame. Access for surface mounted pullboxes (standard and non-standard) shall be provided by means of removable screw-on covers and sides. Flush type pullboxes shall always be of the non-standard type and shall have single door with trim and lock as specified elsewhere herein for panelboards. Pull boxes shall be sized as indicated on the drawings and/or in accordance with the N.E.C. and shall be phosphate treated and finished as specified elsewhere herein for panelboards. Other pull boxes shall be in accordance with these specifications and as specified elsewhere herein or on the

drawings. Pull boxes shall be as manufactured by Empire, Lexington, Standard, or other approved.

1.09 WIRING DEVICES

- A. Unless noted otherwise elsewhere, herein, or on the drawings, the Division 16 Contractor shall furnish and install all wiring devices. Wiring devices furnished by the Division 16 Contractor shall be as manufactured by Hubbell, Leviton, or Arrow Hart, unless noted otherwise, and shall be of the specification grade and type indicated hereinafter or on the drawings and in compliance with the following specifications:

1. Switches: (Unless otherwise noted on drawings and specifications)

Switches: Hubbell 1221-I
Key Switches: Hubbell 1221L and Key

Switches shall be located at the strike side of doors as finally hung, whether indicated on the drawings or not. All three-way and four-way switches shall have ivory toggles unless otherwise noted on drawings.

2. Standard Receptacles: (Unless otherwise noted on drawings or specifications, provide tamper resistant receptacles as follows):

Duplex Receptacle 20A-125V: Hubbell HBL 5362TR
Ground Fault Interrupter 20A-125V: Hubbell GF 5362TR

3. Key Switches:

Check with building custodian and install keyed units where indicated. Provide a key for each switch and receive a signed receipt for records.

- B. All other incidental wiring devices shall be of the same make and quality of those as specified herein.
- C. Furnish and install cover plates for each switch, receptacle, and other wiring devices being installed unless noted otherwise. Several wiring devices located at the same location shall be installed in ganged type boxes as specified under outlet boxes, and such devices shall be provided with multi-gang cover plates of the types specified hereinafter. All cover plates shall be stainless steel "302" plates and shall have a brushed finish as selected by the Engineer for each particular room or area. Plates shall be .04 thick, of same manufacture and device.

1.10 PANELBOARDS

- A. Furnish and install lighting equipment and power panelboards as indicated on the floor plan and in the schedule on the drawing. Panelboards shall be suitable for 120/208 volts, 3 phase, 4 wire service or 277/480 volts, 3 phase, 4 wire or as may otherwise be specified.

- B. The panelboards shall be of the dead front type mounted in a 12 gauge (minimum) galvanized sheet steel cabinet or enclosure suitable for surface mounting as shown on the drawing. Enclosure shall be equipped with sheet steel trims having hinged doors. Trim shall be provided with angle supports, which engage the flange of the cabinet and shall be fastened to the cabinet by means of approved clamps. The use of screws engaging holes in the flange of the cabinet for fastening trim will not be acceptable. Door shall have concealed hinges and paracentric cylinder lock. Panel shall be finish painted with baked-on gray enamel. On the inside of the panelboard, provide a typewritten numerical directory, in a metal frame having a transparent plastic face. Directory shall indicate service controlled by each circuit, voltage service to panel, and feeder size serving panel.
- C. Ample gutter space shall be provided in accordance with the National Electric Code and these specifications, with minimum gutter space of six inches.
- D. Minimum width of panel including gutter space shall be 20 inches. All lugs for incoming and outgoing terminals shall be of the solderless type. Feeder lugs shall be single or multiple types as required. Where cable lug connections are made directly to the bus bars, they shall be made via cast type lugs manufactured of the proper metal alloys so as not to cause a galvanic reaction when connecting the copper cables to the aluminum bus bars.
- E. Panelboards shall be of the bolt on circuit breaker type. Circuit breakers shall be molded case type and shall be of the individual unit construction complete with quick-make, quick-break mechanism; thermal magnetic trip; ambient compensation and shall be interchangeable in the panelboard assembly in ratings from 15 through to 100 amperes on 120/208 volt panels without necessitating bus, line, or assembly rearrangements. All circuit breakers shall have suitable bolt type line terminals so that they can be held in positive contact with their respective links or bus. **Plug-in breakers shall not be acceptable.** All single pole breakers in panel shall be so arranged and connected to the main bus that any three adjacent breakers are connected to Phase A, B, and C respectively and that same relationship of phase sequence is maintained. All branch circuit breakers shall have the number of poles and circuits as indicated on the drawing and shall be as specified hereinafter. Connect all circuits on all panels so as to balance the load as much as possible on all phases.
- F. Panelboards shall be as specified herein. Provide ten (10) circuit breaker handle lock dogs for Custodian's use (per panel).
- G. All busing shall be of high conductivity silver-plated solid copper. Bus bar carrying capacity shall be at least equal to the capacity of the protective device on the panel feeder. Where feeders are oversized in capacity to compensate for feeder length, the panel shall be equipped with lugs equal to the oversize feeder conductors. Alternately, the feeder may be spliced with compression indent splices to transition from the oversize conductor to the normal size conductor (that matches the

panel bus) in a splice box external to the panel. This technique may also be employed at the originating protective devices.

Shaving of conductors to fit lugs is specifically disallowed.

- H. Panelboards shall be as specified and/or similar to Eaton, Siemens, or G.E. in compliance with these specifications.
- I. Where a flush mounted panel is being provided, the Division 16 Contractor shall check the depth of block walls containing same and shall have the panel fabricated to suit space available.
- J. Provide door-in-door panelboard cover unless otherwise specified.
- K. New circuit breakers installed in existing panelboards shall listed for, and shall match the interrupting rating of the intended panel.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16511 - FIRE STOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. Only tested fire stop systems shall be used in specific locations as follows:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- B. Safing slot gaps between edge of floor slabs and curtain walls.
- C. Openings between structurally separate sections of wall or floors.
- D. Gaps between the top of walls and ceilings or roof assemblies.
- E. Expansion joints in walls and floors.
- F. Openings and penetrations in fire-rated partitions or walls containing fire doors.
- G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 03300 - Cast-In-Place Concrete
 - 2. Section 07900 - Joint Sealers
 - 3. Section 04200 - Masonry Work
 - 4. Section 09200 - Lath and Plaster
 - 5. Section 09250 - Gypsum Drywall Systems
 - 6. Section 13080 - Sound, Vibration and Seismic Control
 - 7. Section 13900 - Fire Suppression and Supervisory Systems

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8. Section 15050 - Basic Mechanical Materials and Methods
9. Section 15250 - Mechanical Insulation
10. Section 15300 - Fire Protection
11. Section 15400 - Plumbing
12. Section 16100 - Basic Electrical Materials and Methods

1.05 REFERENCES

- A. Test Requirements: ASTM E-814-02, "Standard Method of Fire Tests of Through Penetration Fire Stops"
- B. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
 1. UL Fire Resistance Directory:
 - a. Fire stop Devices (XHJI)
 - b. Fire Resistance Ratings (BXUV)
 - c. Through-Penetration Fire stop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
 2. Alternate "Omega Point Laboratories Directory" (updated annually)
- C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems" (July 1998.)
- D. Test Requirements: ASTM E 1966-01, "Standard test method for Fire Resistive Joint Systems"
- E. Inspection Requirements: ASTM E 2174 - 01, "Standard Practice for On-site Inspection of Installed Fire Stops."
- F. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- G. ASTM E-84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.
- H. All major building codes: ICBO, SBCCI, BOCA, and IBC.
(Note to specifier: Retain or delete building codes listed above as applicable)
- I. NFPA 101 - Life Safety Code
- J. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

- A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

- B. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 1300.
- B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

- E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) and joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - 1. Hilti, Inc., Tulsa, Oklahoma (or equal)
800-879-8000

2.03 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type,

annular space requirements, and fire-rating involved for each separate instance.

- B. Cast-in place firestop devices for use with non-combustible and combustibile plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
 - 1. Hilti CP 680 Cast-In Place Firestop Device
 - a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
 - 2. Hilti CP 681 Tub Box Kit for use with tub installations.
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant
 - 2. Hilti CP 604 Self-leveling Firestop Sealant
 - 3. Hilti CP 620 Fire Foam
 - 4. Hilti CP 606 Flexible Firestop Sealant
 - 5. Hilti CP 601s Elastomeric Firestop Sealant
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
 - 1. Hilti CP 601s Elastomeric Firestop Sealant
 - 2. Hilti CP 606 Flexible Firestop Sealant
 - 3. Hilti FS-ONE Intumescent Firestop Sealant
- E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
 - 1. Hilti CP 672 Speed Spray
 - 2. Hilti CP 601s Elastomeric Firestop Sealant
 - 3. Hilti CP 606 Flexible Firestop Sealant
 - 4. Hilti CP 604 Self-leveling Firestop Sealant
- F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
 - 1. Hilti CP 677 Speed Plugs
 - 2. Hilti CP 767 Speed Strips
- G. Intumescent sealants, caulking materials for use with combustibile items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - 1. Hilti FS-ONE Intumescent Firestop Sealant

- H. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti FS-ONE Intumescent Fire stop Sealant
 2. Hilti CP 618 Fire stop Putty Stick
 3. Hilti CP 620 Fire Foam
 4. Hilti CP 601s Elastomeric Fire stop Sealant
 5. Hilti CP 606 Flexible Fire stop Sealant
- I. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti CP 618 Fire stop Putty Stick
- J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
1. Hilti CP 617 Fire stop Putty Pad
- K. Fire stop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
1. Hilti CP 642 Fire stop Collar
 2. Hilti CP 643 Fire stop Collar
 3. Hilti CP 645 Wrap Strips
- L. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
1. Hilti CP 637 Trowelable Fire stop Compound
 2. Hilti FS 657 FIRE BLOCK
 3. Hilti CP 620 Fire Foam
- M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical bus ways in raceways, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
- N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
1. Hilti CP 672 Speed Spray
 2. Hilti CP 601s Elastomeric Fire stop Sealant
 3. Hilti CP 606 Flexible Fire stop Sealant
 4. Hilti CP 604 Self-Leveling Fire stop Sealant

- O. Provide a fire stop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
- P. Provide a fire stop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction being penetrated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which fire stop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

- A. Coordinate location and proper selection of cast-in-place Fire stop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place fire stop devices without interferences.

3.03 INSTALLATION

- A. Regulatory Requirements: Install fire stop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL fire stop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing fire stop systems already installed by other trades.

3.05 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess fire stop materials and soiling as work progresses.

END OF SECTION

DIVISION 17

SECTION 17010 - TECHNOLOGY IMPLEMENTATION

Part I - GENERAL

1.01 GENERAL NOTES

- A. The intent of the specification section is to outline the scope of work products and execution relating to furnishing and installing Network Cabling at the new or remodeled buildings and/or building additions. This includes, but is not limited to Backbone and Horizontal cabling comprised of Copper and Fiber Cabling, and support systems are covered under this document and the Division 16 contractor shall complete as part of their bid and subsequent required design, implementation, service and installation.
- B. All work associated with Division 17 and its intent shall be coordinated with all other work as furnished and installed by other trades that may or may not interface, interact or be dependent upon the work herein.
- C. The Division 16 contractor shall meet all required deadlines for installation and implementation and shall notify the Architect/Engineer of any difficulty that he or she faces that may alter these deadlines.
- D. The Division 16 contractor shall also notify the Architect/Engineer or the Owner's designated representative of any design discrepancy, site limitation, or configuration, which would prohibit the contractor from a successful and timely installation. Failure to notify these parties shall result in the contractor's sole responsibility for it.
- E. The Division 16 contractor shall be solely responsible for ascertaining, determining and subsequently paying the appropriate prevailing wage rates for the work herein. The Architect/Engineer and the Owner will be held harmless from these and any decisions that the contractor reaches that pertain to the contractor's work.
- F. The Division 16 contractor shall be responsible for the copper and fiber data cable, cable management and terminations of such as shown on all E/T series drawings.
- G. The Division 16 contractor shall be responsible for the data power and surface raceway as shown on all E/T series drawings.
- H. All technology power and data wiring shall be performed by the division 16 contractor. All references made to the Division 16 contractor shall mean the electrical contractor.

1.02 PROJECT DESCRIPTION

- A. The Network Infrastructure Design is as follows:

- Category 6/6A UTP and STP cabling to the Workstation Locations
- B. Category 6/6A Unshielded Twisted Pair Copper cabling shall be used to connect the workstations to the nearest Telecommunications Closet (TR), Category 6/6A Unshielded Twisted Pair Copper cabling shall be used for the horizontal structured cabling.

1.03 BIDDERS QUALIFICATIONS

- A. All prospective Bidders must possess a minimum of five (5) years continuous experience as a firm doing business under the same name, engaged principally as a contractor for the work proposed.
- B. All prospective Bidders must maintain an experienced technical and in house organization for the project, and must maintain an office facility with full-time employees in a commercial space.
- C. All data wire installers shall be certified CAT 6/6A and Fiber installers, and the contractor shall provide copies of the certifications from manufactures of UTP/STP copper cabling systems and optical fiber cabling systems such as Hitachi Cable of America or equivalent.
- D. All systems, equipment or products herein specified shall be provided and installed by an Authorized Factory Installer for this system, equipment or product.
- E. All prospective Bidders shall be able to provide the Owner with the appropriate manufacturers warranty and service on the proposed equipment. Structured cable manufacturer's warranty shall be a minimum of 20 years.
- F. All prospective Bidders will maintain a staff of trained, certified technicians for equipment being specified for this project.
- G. A minimum of five years experience in the application of specified equipment is required.
- H. A list of projects completed within the last year with contact names and telephone numbers is to be provided upon request.
- I. All prospective Bidders shall use licensed electricians for any electrical work being performed within this contract.

1.04 CONTRACT SUPERVISION

- A. The Division 16 contractor will assign a competent full-time superintendent to the project, and that superintendent shall be maintained on the project for its duration.

1.05 GENERAL PROVISIONS

- A. All Division 16 installations shall be performed by an electrical contractor who is certified in the product specified. A copy of certification documents must be submitted with the bid in order for such bid to be valid. The Division 16 contractor is responsible for workmanship and installation practices in accordance with the wiring program specified. At least 30 percent of the copper installation and termination crew must be certified by the manufacturer specified. In addition, at least 10 percent of the optical fiber installation and termination crew must have technicians level of training and must be certified by the manufacturer specified or other approved organizations in Optical Fiber installation and termination practices.
- B. All electrical installations shall be performed by a Division 16 electrical contractor possessing a New York State Electrical license.
- C. Any specifications that apply to the electrical contractor will be referred to Division 16 specification.
- D. Where the word "Provide" is used, it shall be defined as requiring the furnishing and installing of all items indicated complete in all respects and ready for operation unless otherwise specifically noted.
- E. The Division 16 contractor shall be responsible for furnishing all labor, superintendence, materials, tools, equipment and sources necessary for the complete installation of all data work for this technology implementation project as shown on the plans and as herein specified.
- F. The Clerk of the works or Construction Manager will be assigned to the project by the Owner and will be clearly defined to the contractor before any work commences.
- G. It is the intent of this specification and the accompanying plans that the Division 16 contractor provides a data cabling system complete in every respect and ready to operate. All miscellaneous items and accessories required for such installation whether or not such items or accessories are shown on the plans or mentioned in these specifications shall be furnished and installed.
- H. Where the words inactive components is used it refers to all network materials such as patch panels, jacks, patch cords, etc. that are passive to the network (Infrastructure).
- I. The Division 16 contractor shall, in writing, accompanying his/her bid, report to the Architect/Engineer of any discrepancy or existing condition which would prohibit him/her from performing his/her work to its full extent - a complete and acceptable system.
- J. No "Waiver of Responsibility" for inadequate, incomplete, or defective work will be considered or accepted by the Architect/Engineer unless written notice of a difficulty arising from any existing condition is made part of this Contractor's bid.
- K. At each location that a new voice/data or audio/video cable is provided two (2) patch cords shall be provided. One (1) for the closet side and one (1)

for the device side. Patch cord lengths and colors shall be coordinated and finalized with the Owner.

1.06 GENERAL SPECIFICATIONS

- A. The following Drawings and accompanying specifications are for the sole purpose of providing the Owner with a complete and thorough infrastructure solution.
- B. All inactive components such as the cabling, jacks, racks and such are part of this contract and are the responsibility of the Division 16 contractor to supply and install according to industry standards and accompanying specifications.
- C. Workstations and any software running within the workstations are outside of this scope and thus not part of this contract.
- D. It is the intent of this specification and accompanying DWG's to show an overall network infrastructure design but not a complete detail of all components within the design. It is the responsibility of the Division 16 contractor to provide, install and configure all materials and components in order to have a complete and thorough data network infrastructure system.
- E. The Division 16 contractor will provide the specified manufacturer solution for the CAT-6/6A copper cabling in order to provide the Owner with an extended warranty. Alternate manufacturer solutions will be accepted at the discretion of the owner/engineer.
- F. The Division 16 contractor will provide the specified manufacturer solution for the fiber cabling in order to provide the Owner with an extended warranty. Alternate manufacturer solutions will be accepted at the discretion of the owner/engineer.
- G. Wherever a discrepancy occurs in the specifications or the drawings or between the drawings and the specifications the contractor will accept the architect/engineer's interpretation of such issue(s).
- H. Neither the drawings nor the specifications shall take precedence over the other. Where conflict occurs between both, the one with the more stringent standards shall supercede the other.

1.07 MATERIALS

- A. All materials, active or inactive, mentioned for this project are described by specific brand names. It is the intent of the architect/engineer to set a performance standard based on the specific brand name mentioned. The contractor may submit any other brand name

just as long as the equipment or materials meet the performance standards as that of the specific brand that the architect/engineer has chosen.

B. It is the responsibility of the contractor to provide, install and configure all materials or equipment mentioned or not mentioned through out this package in order to achieve a complete and thorough structured cabling system as described previously.

C. The cabling system described in this specification is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:

1. ANSI/TIA 568.0-D, Generic Telecommunications Cabling for Customer Premises
2. ANSI/TIA 568.1-D, Commercial Building Telecommunications Cabling Standard
3. ANSI/TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standard
4. ANSI/TIA-568C.3 Optical Fiber Cabling Components Standard
5. ANSI/TIA-568C.4 Coaxial cabling Components Standard
6. ANSI/TIA 606B, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
7. ANSI/TIA 607-C, Commercial Building Grounding/Bounding Re ANSI/TIA 942-A Telecommunications Infrastructure Standard For Data Centers
8. TIA-862-A, Building Automation Systems Cabling Standard
9. ANSI/TIA 569-D, Commercial Building Standard for Telecommunications Pathways and Spaces
10. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) - 13th Edition
11. National Fire Protection Agency (NFPA - 70), National Electrical Code (NEC) -2017 Edition

D. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Division 16 contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

E. This document does not replace any code, either partially or as a whole. The Division 16 contractor must be aware of local codes that may impact this project.

F. It is the responsibility of the Division 16 contractor to notify the architect in writing if there are any conflicts with the materials or products the architect/engineer has specified that will make a complete network system installation impossible or difficult.

1.08 ALTERNATES

- A. Although the Owner does not restrict, by use of a brand name or model, it does have certain features, which it deems desirable. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- B. Bidders wishing to submit alternate equipment shall submit to the Architect/Engineer the system proposed to provide an equivalent functional alternate to meet specifications. Bidders shall provide all pertinent information including: manufacturer specification sheets, working drawings, shop drawings and a demonstration of the system.
- C. Contractors bidding equipment or systems other than those items specified shall submit those items as equivalents or substitutions to those specified on the Bid Proposal Form in the applicable location. Complete specifications and literature describing alternates MUST be attached to the Bid Form on each item bid. Contractors bidding on substituted or equivalent items may be required to provide a sample of same for evaluation.
- D. No substitutions will be considered after the Contract award.

1.09 CODES

- A. All work included within the specification package and in the drawings shall be governed by the following rules, guidelines, standards and authorities. All documents listed are believed to be the most current:

NEC	National Electric Code 2017 Edition
OSHA	Occupational Safety & Health Administration
ANSI	American National Standards Institute
NFPA	National Fire Protection Association
ASA	American Standards Association
IEEE	Institute of Electrical & Electronics Engineers
NEMA	National Electronics Manufacturers Association
UL	Underwriters' Laboratory
ELT	Electrical Testing Laboratories Inc.
EIA	Electrical Industries Association
TIA	Telecommunications Industries Association
FCC	Federal Communications Commission
ISO	International Standards Organization
BICSI	Building Industry Consulting Service International

- B. All equipment or material that is subjected to UL listings shall be properly labeled.

Part II - Scope of Work

2.01 INSTALLATION CHECKLIST

A. The Division 16 contractor shall have the following information in order to install a complete and accurate job:

- The Drawing Set
- The Design Documentation Project Manual.

2.02 WORK INCLUDED

A. All work required to install and configure a complete data network infrastructure system as described previously will be the Division 16 contractors responsibility. The work included under this specification consists of furnishing all labor, equipment, materials/supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Division 16 contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install a complete telecommunications wiring infrastructure as specified later in this specification package according to industry standards.
2. Furnish, install and terminate all UTP cable.
3. Furnish and install all wall plates, jacks, patch panels and patch cords.
4. Furnish and install all required cabinets and/or racks as required and as indicated.
5. Furnish any other material required to form a complete system.
6. Perform link or channel testing (100% of horizontal and/or backbone links/channels) and certification of all components.
7. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
8. Adhere and comply with all requirements of specified programs.

C. The Division 16 contractor will provide and install all cabling at the teacher drop locations where applicable. This includes all video and audio jumpers and video and audio patch cables.

D. The Division 16 contractor will terminate all data cabling as specified later in this specification package according to industry standard in specified surface raceway provided and installed by the Division 16 electrical contractor.

E. The Division 16 contractor shall coordinate with the electrical contractor all data drop location setup components as mentioned in specification section 17010 and drawings.

- F. The Division 16 contractor will provide and install all specified materials at all specified wire closet locations.
- G. The division 16 contractor will be responsible for any damage done to any part of the buildings during the installation of the network wiring.
- H. All building penetrations used for the network wiring infrastructure shall be the responsibility of the Division 16 contractor. This includes core drilling and access to any rooms.
- I. The electrical contractor will be responsible for the removal and relocation of any smart boards, tack boards, tack strips, etc.
- J. The electrical contractor will be responsible for any cutting and trimming that may be required to install specified surface raceway in all data drop locations. The contractor shall be responsible for all patching and painting to restore to original condition.
- K. The Division 16 contractor will provide all testing results for the specified equipment and products.
- L. The Division 16 contractor will follow all industry standards for the installation of all materials and equipment.

2.03 GUARANTEE/WARRANTY

- A. The Division 16 contractor will be able to provide two separate extended warranties for the data cabling being installed, one for the CAT-6/6A copper cable installation and one for the Fiber Optic cable installation.
- B. The extended warranty must be backed by the manufacturer and shall be no less than 20 years.
- C. If the Division 16 contractor is submitting alternate materials or equipment, the substituted material or equipment shall provide the extended warranty that is required of the system.
- D. Any failed network equipment or material shall be the responsibility of the Division 16 contractor and shall be replaced immediately.
- E. Besides the extended manufacturer warranty, the Division 16 contractor will provide the Owner with a separate warranty notifying the Owner that all work performed by this contractor or any of his/her subcontractors or anyone the contractor employed for any installation of the network infrastructure for the Owner was done according to the specifications of the project and in accordance with all applicable industry standards. This warranty will guarantee all work against faulty and improper material and workmanship. This warranty shall be no less than 1 year and any other warranties for longer terms that apply to any of the components or materials shall apply.

- F. The Division 16 contractor will provide the extended manufacturer's warranty and his/her own personal warranty no longer than 15 days after he/she has stated in writing and the architect or engineer have verified that the full network installation and configuration has been finished and completed.

2.04 WORK SCHEDULING

- A. The Division 16 contractor must submit, in writing to the Owner, a schedule of the work that will be performed throughout the project by building. The work schedule shall be submitted for approval to the clerk of the works or construction manager no later than 7 days after the award has been issued.
- B. The Division 16 contractor must adjust his/her work schedule and working hours according to the Owner's schedule. It is the responsibility of the contractor to coordinate his/her schedule with that of the Owner.
- C. The Division 16 contractor's work will not be allowed to interfere with the Owners daily work schedule unless given direct permission from the clerk of the works or construction manager.
- D. The Division 16 contractor will be responsible for cleaning up any debris caused during the installation after each work period (daily).
- E. No data cables shall be left exposed at the end of each work period and any equipment specified for the network design shall not be left accessible to the public. The Division 16 contractor must secure all data wiring and network components at the end of the work period.
- F. The clerk of the works or construction manager shall perform a visual inspection at the end of the workday in order to determine that the Division 16 contractor is following proper procedures for securing and cleaning the work area.
- G. Any drilling that has to be performed must first be cleared with the clerk of the works or construction manager or architect/engineer.
- H. Any relocation or removal of any existing equipment such as tables, shelves, file cabinets etc, shall first be cleared with the clerk of the works or construction manager for approval.
- I. The Division 16 contractor will replace any ceiling tiles removed during the workday as to not have any exposed wires during the next Owner day.
- J. No surface raceway shall be left exposed with data or electrical cables installed.
- K. If the Division 16 contractor has to integrate any existing LAN(S) into the new LAN, the contractor has to notify the Owner or the clerk of the works or construction manager of any interruption that might occur during the process. The clerk of the works or construction manager will insure

that all parties are notified, which may be affected by the down time on the existing network in order to achieve a full installation and integration to the new LAN.

- L. The Division 16 contractor must notify the clerk of the works or construction manager and architect/engineer of any conditions that might cause a delay in the completion of the project.
- M. The Division 16 contractor must coordinate with the clerk of the works or construction manager for a storage location(s).
- N. The Owner will not provide a location where the contractor can store his/her equipment. The Division 16 contractor shall provide his/her own storage facilities.
- O. The Division 16 contractor will have to coordinate his/her schedule with that of the electrical contractor's since the electrical contractor will be providing and installing the surface raceway at the data drop locations.

2.05 SUBMITTALS

- A. With the bid response the Division 16 contractor will submit a list of all the subcontractors that will be involved with the project.
- B. With the bid response the Division 16 contractor will submit all cut sheets for all materials and equipment being proposed for installation. This list will be subject to review and approval by the architect.
- C. All equipment or material in a material list shall first be approved before any shop drawings can be submitted by the contractor.
- D. Before any data cables are pulled, the Division 16 contractor must submit a printed schedule of all data drops locations. The schedule shall indicate the data drop identification and termination location. The engineer or architect must review and approve the pull schedule prior to startup of any work.
- E. Shop drawings shall be submitted with sufficient time for the engineer or architect to review drawings.
- F. Shop drawings and cut sheets must be submitted for all equipment or material being used for project completion. The cut sheets shall be original catalog or PDF reproduced sheets clearly identifying the item submitted.

2.06 Drawings

- A. It shall be understood that the details and drawings provided with the specifications are diagrammatic. They are included to show the intent of the specifications and to aid the Division 16 contractor in bidding the job. This contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.

- B. The Division 16 contractor shall verify all dimensions and distances at the site and be responsible for their accuracy.
- C. Prior to submitting the bid, the Division 16 contractor shall call the attention of the engineer or architect any materials or apparatus the contractor believes to be inadequate and to any necessary items of work omitted.

Part III - Material Specifications

3.01 COPPER NETWORK CABLING

- A. Horizontal cabling, cable to the workstation, shall be Category 6/6A Unshielded Twisted Pair, 4 pair, as manufactured by Hitachi Cable of America or equal.
- B. Cable must be plenum rated with UL, CMP listing
- C. Cable must be 4 pair 23 AWG Solid UTP, FEP primary insulation and a low smoke PVC jacket.
- D. The copper cable must be able to handle the following applications
- Gigabit Ethernet/1000 Base-T
 - Fast Ethernet/100 Base-T
 - Ethernet/10 Base-T
 - 155 Mbps ATM
 - IEEE 802.3
 - IEEE 802.3ab
 - IEEE 802.5
 - IEEE 802.12
 - ISDN
 - Voice
 - 550MHZ Broadband Video
- E. The Category 6 cable shall meet or exceed ANSI/TIA Category 6 requirements for NEXT, Characteristic Impedance, SRL, Attenuation and Delay Skew, PS-NEXT, ELFEXT and PS_elfext.
- F. All UTP drops must be certified at 20 degrees C with a length not to exceed 90 meters.
- G. All UTP drops must perform within the following parameters at 250 MHz:

Electrical Parameters (@ 250MHz)	TIA 568-C.2 verified min. std. (additional performance margin guaranteed)
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Insertion Loss	32.8 dB
NEXT	38.3 dB (41.3 dB)
PSNEXT	36.3 dB (39.3 dB)
ACRN	5.5 dB
PSACRN	3.5 dB
ACRF	19.8 dB (22.8 dB)
PSACRF	16.8 dB (19.8 dB)
Return Loss	17.3 dB

1. Termination of the copper cable shall be at an 8-position snap-in modular jack following the T568B pin assignment. All audio/video over CAT 6 cable components shall be terminated using the color code on the back of the modules. The maximum allowable amount of untwisting during cable termination shall be less than ½ inch.
2. As an option, Category 6A cabling shall be considered. This cabling shall meet all of the specifications listed above. In addition to the above, it must support 10G base T;

Electrical Parameters (@ 500 MHz)	TIA 568-C.2 verified min. std. (additional performance margin guaranteed)
Insertion Loss	45.3 dB
NEXT	33.8 dB
PSNEXT	31.8 dB
ACRF	13.8 dB
PSACRF	10.8 dB
Return Loss	15.2 dB
PSANEXT	52.0 dB (58.0 dB)
PSAACRF	24.2 dB (30.2 dB)

3.02 MULTI-MODE FIBER OPTIC CABLE-

- A. The backbone cable between the zone cabling box and the existing ER shall be Armored 12 strand 50/125 multimode cable OM3 or OM4 LOMM Fiber
- B. All fiber optic strands shall be terminated at both ends with LC Connectors. These Optical Fiber cables shall be either Quick Crimp Connectors or Pig tails that are to be fusion spliced, as specified.
- C. Certified installers for such equipment shall perform all terminations.
- D. Minimum bend radius allowed of the cable shall not exceed 12 times the outside diameter of the cable which is approximately 2 inches.

- E. Connectors shall have a maximum of 0.5dB loss per connection and be industry standard type designed for LOMM 50-micron fiber.
- F. Provide fiber optic patch cords to connect all pairs from fiber patch panel to voice and data switches. Cables shall be LC to LC 1, 2 and 3 meter for each closet.

3.03 MAIN WIRE CLOSET Equipment Room (ER)/REMOTE WIRE CLOSET Telecommunications Room (TR) MATERIALS

- A. These materials shall include but not limited to vertical cable management and support for the patch cords at the front of the rack and wire management, support and protection for the horizontal cables inside the legs of the rack.
- B. Ladder Rack and Waterfall cable management shall be provided at the top of the rack for all network cable and fiber entering the rack for protection and to maintain proper bend radius and cable support.
- C. Wire management shall also be mounted above each patch panel and/or piece of equipment on the rack.
- D. The rack shall include mounting brackets for cable tray ladder rack to mount to the top of the rack.
- E. Racks shall have EIA hole pattern on front and rear.
- F. Rack shall be black in color to match the patch panels and cable management.

3.04 DATA DROP LOCATION AND MATERIAL

- A. Refer to Technology Series Drawings for a list of all materials at all data drop locations.
- B. All data drop network cable shall be neatly dressed, secured and concealed throughout the installation.
- C. The Division 16 contractor shall install the Data Drop network cables with a maximum of 1-meter service loop (slack cable) neatly coiled and secured in ceiling space above at the station location and a 2-meter service loop at the closet end.

Part IV - Detail Specification

4.01 CABLE ROUTING AND INSTALLATION

- A. The following guidelines apply to all technology cabling being installed and routed through the hallways, classrooms or any other location where the specified cable will be installed.
- B. It is the responsibility of the Division 16 contractor to determine the best possible path for any cable run as long as it follows the network design set forth by the architect/engineer.
- C. Wherever possible the Division 16 contractor will route all his/her cable in the cavity created by the drop ceiling, crawl spaces or attic space. All cables shall be plenum rated.
- D. Wherever the Division 16 contractor is unable to route cables as mentioned in item C, the contractor shall run cables in architect/engineer approved surface raceway or conduit at a maximum fill capacity of 40%. For any penetrations of conduit or raceway through fire rated partitions, please refer to specification section 16511 for fire stopping requirements.
- E. All cabling shall be supported in cable support system such as "J" hooks or any other approved support system. Data cables shall be bundled with plenum rated hook and loop Velcro ties to a snug fit, which does not deform the cable geometry.
- F. All network cables shall be secured a minimum of six (6) inches above the ceiling T-bar grid.
- G. The Division 16 contractor should maintain TIA/EIA standards which deal with the proximity of communications cabling to high voltage cabling, motors, transformers, fluorescent lighting and ballast's, etc... If these standards can't be met the contractor shall notify the architect/engineer. In addition to the installation standards from BICSI,
- H. The Division 16 contractor shall not rest, fasten or support the data cables on; steam pipes, electrical conduit, insulated pipes or sprinkler pipes, ceiling grid supports, water pipes or HVAC ducting.
- I. In areas without adequate support structures, the Division 16 contractor shall install "J" hooks or additional ceiling grid hangers on five (5) foot off center secured to a building structure.
- J. Strip ties, saddles and J-hooks shall be plenum rated and must be installed as per industry standards.
- K. The Division 16 contractor shall not install more than 15 individual data cables to a single hanger or "J" hook without the use of a two-inch wide saddle to eliminate strain on the individual cables.
- L. The Division 16 contractor shall be responsible for replacing or patching any system that was damaged during network installation.

- M. The Division 16 Contractor will not support any data cables with power cables or fire alarm cables within the same support system.
- N. The Division 16 contractor must avoid installing all cable in any location that may cause any obstruction to any existing building functions.
- O. If Division 16 contractor chooses to run cables in attic space, he/she must lay cables in J-Hooks or cable trays.

4.02 WALL OR FLOOR PENETRATIONS

- A. The Division 16 contractor must notify the clerk of the works or construction manager of any drilling that may be required to install data cables.
- B. The Division 16 contractor is responsible for drilling that is not performed by the General Contractor in all locations needed to install specified data wiring.
- C. The Division 16 contractor must provide and install all sleeves and conduits that may be necessary for a proper installation of their specified data wire.
- D. If necessary, the Division 16 contractor must provide his/her own separate wall or floor penetrations for data wiring. The contractor may not use existing penetrations because existing penetrations may not be sleeved and damage may be caused to existing wires at that location.
- E. If conduit is being used the size of conduit must be determined by the number of cables that will be installed within conduit. Conduit fill shall not exceed 40 percent.
- F. Conduit shall be installed with the appropriate bend radii to maintain the required bend radius for the Copper and Fiber Optic Cable. Install pull boxes every 100 feet and at every 90 degree turn.
- G. It is the responsibility of the contractor to provide fire stopping at all penetrations made by him/her in all fire-rated and time rated walls, floors, ceilings and partition assemblies in accordance with National Electric Code.
- H. The Division 16 contractor shall provide the Owner with a fire stopping system, installed to resist the spread of fire and the passage of smoke and other gases.
- I. The fire stopping material shall be approved and tested by U.L. or other qualified and approved inspection agency for the designated fire resistance rating.
- J. The fire stopping material shall contain no detectable asbestos and comply with all local regulations.

4.03 TELECOMMUNICATIONS ROOM (TR) INSTALLATION

- A. Refer to Technology Drawings for a list of materials at all wire closet locations.
- B. Wall mounted termination shall be mounted on 4' x 8' x .75" void free, fire resistant plywood. The plywood shall be mounted vertically 12" above the finished floor. The plywood shall be painted with two coats of white fire retardant paint.
- C. The network cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B standard and best industry practices.
- D. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.
- E. Cables shall be neatly bundled and dressed to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- F. All cables shall be routed through a cable support system, ladder rack and waterfall cable management shall be provided at the top of the rack for all network cable and fiber entering the rack for protection and to maintain proper bend radius and cable support.
- G. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
- H. Racks shall have EIA hole pattern on front and rear.
- I. The Division 16 contractor must provide 20 percent spare ports in Category 6/6A and Fiber patch panels for future use.
- J. Any cables leaving or entering the wire rack shall be neatly bundled and encased in approved cable management system.

4.04 DATA DROP LOCATION INSTALLATION

- A. The Division 16 Electrical Contractor will provide and install all raceway, divider, power, receptacles and faceplates within the Data Drop Location except for the Category 6 Modular Jacks (refer to E/T series drawings).
- B. All materials that will be mentioned in this section have been identified and specified earlier in this specification package under Part III.

- C. Refer to Technology Drawings for a complete list of materials at all data drop locations.
- D. The Division 16 Electrical contractor will install dual surface raceway in specified locations. Electrical contractor will provide and install divider wall within surface raceway. Divider wall must run continuously throughout surface raceway.
- E. All surface raceway shall be mechanically anchored with appropriate fasteners.
- F. Electrical contractor must terminate metal jacket of power cable/conduit properly at entrance of surface raceway.
- G. All data drops shall be spaced 3' on center. The Division 16 contractor shall notify the clerk of the works or construction manager if this setup is not possible and then contractor shall space out data drops evenly about the length of surface raceway that can be installed.
- H. The Division 16 contractor will install CAT-6/6A copper cable within surface raceway and terminate it in front loading Enhanced CAT-6 modular jacks following T568B standards. Modular jacks shall be installed in snap in faceplates which will be installed in specified molded covers.
- I. The Division 16 Electrical contractor is responsible for all branch circuits, receptacles and hanging device brackets if specified (refer to E/T series drawings).
- J. Electrical contractor will supply and install all accessories as required for a complete installation of surface raceway (refer to E/T series drawings).
- K. Cable shall be labeled at each end.
- L. All label printing will be machine generated using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.
- M. The Division 16 contractor shall coordinate with the architect/engineer any surface raceway configuration changes caused by any obstacles and or casework locations.
- N. Cutting and notching of any ornamental trimming will be the Division 16 electrical contractor's responsibility. The electrical contractor must notify the clerk of the works or construction manager if any cutting for proper installation has to take place.
- O. Electrical contractor shall notify the clerk of the works or construction manager if installation of surface raceway is impossible at any specified location.

- P. Electrical contractor shall notify the clerk of the works or construction manager if installing a different setup than that which has been specified.

Part V - Project Close-out

5.01 GENERAL PROVISIONS FOR TESTING

- A. Before final application is considered for review the Division 16 contractor must submit all test results to the architect/engineer in order for them to be reviewed and accepted.
- B. The clerk of the works or construction manager can be present during such testing and will be able to inspect contractor installation and workman-ship.
- C. Any work that does not comply with specifications mentioned throughout this specification package or industry standard shall be replaced and reinstalled at contractor's expense.
- D. Certificate of compliance and all test results shall be provided to the Owner upon each item of testing.
- E. Any failed copper cables or fiber optic cables shall be removed and re-installed. If a fiber strand fails out of the full fiber optic cable bundle then the contractor will denote that fiber strand and remove it from any termination equipment. Data contractor will then replace that failed # of strands.
- F. Electrical Contractor shall submit written test reports for all types of cables and on each individual cable. All individual test reports shall be bound into a booklet form. Electrical Contractor shall submit (1) paper copy of final testing report to Architect/Engineer and all data on CD. For multiple buildings provide (1) copy for each building involved in the project.
- G. Prior to the start of work, Electrical Contractor shall submit test booklet format and blank test report forms for Engineer approval.
- H. Report booklet shall include final riser diagrams with cable identification numbers.
- I. Provide cover sheet per building including all nodes and associated test results. Cover sheet shall include Building Name, Wiring Closet

Number, Type of Cable, Room Number, Room Name, Result (Pass or Fail), Length, etc.

5.02 Category 6/6A COPPER CABLE TESTING

- A. Category 6 copper cable shall meet all manufacturing standards and all ANSI/TIA 568C.2 standards for attenuation, Propagation Delay, Delay Skew, NEXT, PSNEXT, ELFEXT, PSELFEXT and return loss.
- B. A field tester meeting the requirements set forth in the 568C.2 standard and use the latest version of the Fluke tester or an equivalent.
- C. All cabling testing shall be done at not only all points of connectivity to the network, but also at each cable for any breaks or damage to ensure connectivity and compliance with the network and EIA/TIA standards.
- D. The testing certification sheets shall be made part of the required "Close-out" documentation. Testing sheets shall include wire map, resistance, length, capacities, Attenuation, NEXT, Propagation Delay, Delay Skew, Return Loss, PSNEXT, ELFEXT and PSELFEXT for installed cable. Cable results of the pass results must be submitted in an electronic and paper format. It must be the full tests results from the tester in its native format. * Pass is NOT acceptable.

5.03 FIBER OPTIC CABLE TESTING

- A. The Division 16 contractor shall test all optical fiber cable before installing it. A visual continuity test shall be enough.
- B. The Division 16 contractor shall use LAN test equipment such as Fluke or equivalent for all installed fiber optic cabling. This testing documentation shall be completed per the ANSI/TIA 568C.3 requirements and be made part of the required "Close-out" documentation. The tested cable shall also be certified to support the required protocols for selected network applications.
- C. For complete and accurate testing for fiber optic cables the Division 16 contractor shall follow the following guidelines:
 - Confirm test jumpers are of the same fiber core size and connector type as the cable system.
 - Ensure that optical sources are stabilized and have center wavelengths within ± 20 nm of the 850/1300 nm wavelength.
 - Test set-up and performance shall be conducted in accordance with ANSI/TIA 568C.3 standards.
 - Power meter is calibrated at each of the nominal test wavelengths and traceable to the National Institute of Standards and Technology (NIST)

- Contractor must confirm all system connectors, adapters, and jumpers are properly cleaned prior to the measurement.
 - System loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 for singlemode fibers.
 - Division 16 contractor will be testing for end-to-end attenuation. The attenuation shall not exceed manufacturer's specifications and verified by ETL to ANSI/TIA 568C.3 specifications.
- D. The Division 16 contractor must measure the attenuation of each connected link after each installation.
- E. If attenuation level results are not acceptable, the contractor must perform OTDR testing on failed cable in order to find out what causes the loss and where it occurs in the cable. The contractor will make appropriate adjustments or reinstallation of the cable in order for the cable to pass attenuation level results.

5.04 AS BUILT DRAWINGS

- A. The Division 16 contractor must provide the architect/engineer with as built drawings in an electronic format compatible to AUTOCAD. No hand-generated drawings shall be acceptable. A paper set and an electronic set shall be provided to the Owner.
- B. The Division 16 contractor may acquire the background drawings from the architect/engineer upon request. Contractor's drawings can only be used for this project and may not be altered to perform any other work at this Owner's site. A Twenty Five dollar (\$25) per drawing fee will be charged for every AutoCAD drawing requested.
- C. The Division 16 contractor must fill out data information charts and turn them over to the Owner. Information charts must be reproduced in written format as well as electronic format.

5.05 SYSTEM WARRANTY, GUARANTEES, AND MANUALS

- A. The Division 16 contractor will provide all system and product guarantees as mentioned in section 2.03 to the Owner no later than 10 days after the contractor has submitted in writing of project completion.
- B. The Division 16 contractor will provide the Owner all manufacturer manuals for all the installed equipment. Manuals should be clearly labeled and must be provided in some sort of binder or folder for storage purposes.

END OF SECTION