

**YONKERS
PUBLIC SCHOOLS**



**SCHOOL FACILITIES MANAGEMENT
CONTRACT MANUAL AND SPECIFICATIONS**

for the

**PHASE 1 OF DOORS, BOILER SYSTEM REPLACEMENT
AND SITE UPGRADES AT SCHOOL 29**

BID NO.: ****

OPENING DATE: MONTH DAY YEAR AT 2:00 PM

SED #66-23-00-01-0-029-012

YPS JOB #10878

CONTRACT #1 - GENERAL CONSTRUCTION – SITE WORK
CONTRACT #2 - GENERAL CONSTRUCTION – EXTERIOR DOORS AND INTERIOR
CONTRACT #3 - HVAC CONSTRUCTION
CONTRACT #4 – PLUMBING CONSTRUCTION
CONTRACT #5 -ELECTRICAL CONSTRUCTION

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The undersigned certifies that to the best of Architect/Engineer's knowledge, information and belief, the plans and specifications are in compliance with applicable provisions of the New York State Uniform Fire Prevention and Building Code, The New York State Energy Conservation Construction Code, the New York State Education Department's Manual of Planning Standards and Industrial Code Rule #56.

SECTION 01 1000
SUMMARY OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of roof replacement, interior renovations and door replacement as defined within the Invitation and Instructions to Bidders for the Saunders Trades and Technical High School as depicted on the accompanying Contract Drawings and the Technical Specifications.
 - 1. Project Location: 745 Midland Avenue, Yonkers, New York
 - 2. Owner: Yonkers Public Schools
- B. Contract Documents were prepared for the Project by Fuller and D'Angelo, P.C., Architects and Planners

1.3 CONTRACTS

- A. Contract Type: Multiple prime contracts each based on a Stipulated Price as described in Section A .
- B. Contract Type: Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Each contract is performed concurrently and coordinated closely with construction activities performed on Project under other contracts. Contracts for this Project include the following:
 - 1. General Contractor - Site Work - Contract #1
 - 2. General Contractor - Exterior Doors and Interior Work - Contract #2
 - 3. HVAC Contractor - Contract #3
 - 4. Plumbing Contractor - Contract #4
 - 5. Electrical Contractor - Contract #5
- C. The work of each separate prime contract are identified in this section, specifications and on the Drawings.
- D. Local custom and trade-union jurisdictional settlements do not control the scope of Work included in each prime contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected contractor(s) shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
- E. If it becomes necessary to refer to the contract documents to determine which prime contract includes a specific element of required work, begin by referring to the prime contracts, themselves; then, if a determination cannot be made from the prime contracts, refer, in the following order, to the Supplementary Conditions, this section of the Specifications, followed by the other Division - 1 sections and finally with the drawings and other sections of the specifications.
- F. If, after referring to the contract documents, it cannot be clearly determined which prime contractor will perform a specific item of required work, then that item of work will be brought to the architect's or construction manager's attention in writing for determination.
- G. Summary of references: Work of the prime contracts can be summarized by reference to the prime contracts, General Conditions, Instructions to bidders, specification sections, drawings, addenda, or Modifications to Contract Documents issued subsequent to the initial printing of this Project Manual, and including but not necessarily limited to printed material referenced by any of these. It is recognized that the work of the prime contracts is unavoidably affected or influenced by governing regulations, natural phenomenon, including weather conditions, and other forces outside the contract documents.

- H. Contractors shall include all labor materials, plans, tools, equipment, and supervision which are required for or incidental to the proper completion of the work as indicated on the drawings and described in the following specification sections.

DIVISION 0 - BIDDING DOCUMENTS, CONTRACTS AND CONDITIONS (Applicable to all contracts)

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1.4 CONTRACT No. 1 - GENERAL CONSTRUCTION - SITE WORK

- A. In addition to the General Requirements, Division 1, included in this bid package the General Construction Contractor - Site shall provide for proper completion of the Site work and construction, as indicated on drawings AR-10, A-10, A-11, A-12, A-13, A-14, A-20, A-21, A-22, C-1 and C-2 and in accordance with the terms and conditions described in the following specification sections. :

DIVISION 03 - CONCRETE

03 3000	CAST-IN-PLACE CONCRETE
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SPECIAL NOTES: CONTRACT #1 - GENERAL CONSTRUCTION - SITEWORK

General Contractor - Site shall excavate and backfill for electrical conduits and light pole bases provided and installed by Electrical Contractor.

1.5 CONTRACT NO. 2 - GENERAL CONSTRUCTION - EXTERIOR DOORS AND INTERIOR

- A. In addition to the General Requirements, Division 1, included in this bid package the General Construction Contractor- Interior shall provide for proper completion of all exterior door replacement and interior general construction work, including asbestos abatement, generally as indicated on drawings ASB-100, A-100, A-101, A-102, A-103, A-104, A-105, A-150, AR-200, A-200, AR-300, AR-301, A-300, A-301, A-425, A-430, A-500, A-501, A-700, A-701, A-702, A-800, A-900, A-901, A-902, A-903 and A-925 and in accordance with the terms and conditions described in the following specification sections:

DIVISION 02 -EXISTING CONDITIONS

02 0280 ASBESTOS REMOVAL AND DISPOSAL

DIVISION 03 - CONCRETE

03 5400 CAST UNDERLAYMENT

DIVISION 04 - MASONRY

04 0100 MAINTENANCE OF MASONRY

04 2000 UNIT MASONRY

DIVISION 05 - METALS

05 5000 METAL FABRICATIONS

05 5213 PIPE AND TUBE RAILING

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000 ROUGH CARPENTRY

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 8400 FIRESTOPPING

07 9005 JOINT SEALERS

DIVISION 08 - OPENINGS

08 1113 HOLLOW METAL DOORS AND FRAMES

08 7101 FINISH HARDWARE

08 8000 GLAZING

DIVISION 09 - FINISHES

09 3000 TILING

09 5100 ACOUSTICAL CEILINGS

09 6500 RESILIENT FLOORING

09 9113 EXTERIOR PAINTING

09 9123 INTERIOR PAINTING

DIVISION 10 - SPECIALTIES

10 1400 SIGNAGE

10 2113 PLASTIC TOILET COMPARTMENTS

10 2800 TOILET AND BATH ACCESSORIES

1.6 CONTRACT No. 3 - HVAC CONSTRUCTION

In addition to the General Requirements, Division 1, included in this bid package shall provide for proper completion of the work for all HVAC equipment and related construction, as generally indicated on drawings H201 and H301 and in accordance with the terms and conditions described in the following specification sections:

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07 8400 FIRESTOPPING

DIVISION 23 - HVAC

23 0100 GENERAL CONDITIONS

23 0110	SCOPE OF WORK
23 0260	DUCTLESS SPLIT SYSTEMS
23 0300	FANS
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23 0440	DAMPERS AND MISCELLANEOUS
23 0460	AUTOMATIC TEMPERATURE CONTROLS
23 0470	TESTING, START-UP AND ADJUSTMENTS.
23 0480	GENERAL LABELING, VALVE CHARTS AND PIPING IDENTIFICATION
23 0490	GUARANTEE

1.7 CONTRACT No. 4 - PLUMBING CONSTRUCTION

In addition to the General Requirements, Division 1, included in this bid package shall provide for proper completion of all Plumbing work as indicated on drawing P101 and in accordance with the terms and conditions described in the following specification sections:

07 8400	FIRESTOPPING
07 9200	JOINT SEALERS

DIVISION 22 - PLUMBING

22 0100	GENERAL CONDITIONS
22 0125	SCOPE OF WORK
22 0130	WATER SUPPLY SYSTEM
22 0160	SANITARY AND STORM DRAINAGE SYSTEMS
22 0300	PLUMBING FIXTURES AND EQUIPMENT
22 0420	SUPPORTS, SLEEVES AND PLATES
22 0430	INSULATION
22 0470	TESTS AND ADJUSTMENTS
22 0480	TAGS, CHARTS AND IDENTIFICATION
22 0490	GUARANTEE

1.8 CONTRACT No. 5 - ELECTRICAL CONSTRUCTION

In addition to the General Requirements, Division 1, included in this bid package shall provide for proper completion of the electrical work and related construction as indicated on drawings E001, E101, E201, E202, E301, E302, E303, E304, E501, E601, E701, SE-000, SE-100S, SE-101A, SE-101B, SE-200, SE-201, SE-300, SE-301, SE-303, SE-700, SE-701, SE-702A, SE-702B, SE-703, SE-703A, SE-703B, SE-704, SE-705, SE-705A and SE-706, and in accordance with the terms and conditions described in the following specification sections:

Note: Electrical Contractor shall provide wiring for and install devices indicated on SE series drawings. All devices, equipment and accessories and programming shall be provided by the owner. See specification section 00 4440.

DIVISION 0 - CONTRACT REQUIREMENTS

00 4440	OWNER SUPPLIED CONTRACTOR INSTALLED ITEMS
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DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07 8400	FIRESTOPPING
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26 0100	GENERAL CONDITIONS
26 0125	SCOPE OF WORK
26 0150	APPROVED MANUFACTURERS
26 0200	CONDUIT FOR ELECTRICAL SYSTEMS
26 0300	WIRE AND CABLE
26 0320	OVERCURRENT PROTECTION DEVICES
26 0350	BOXES
26 0400	WIRING DEVICES
26 0455	DIGITAL LIGHTING CONTROL SYSTEM
26 0500	SUPPORTING DEVICES
26 0550	GENERAL LABELING AND IDENTIFICATION
26 0600	DISCONNECT SWITCHES
26 0650	GROUNDING
26 0800	FIRE ALARM SYSTEM
26 0825	PUBLIC ADDRESS SYSTEM
26 0900	GUARANTEE

1.9 CONTRACTOR USE OF PREMISES

- A. Construction Operations: Limited to areas designated by the Owner.
- B. Arrange use of site and premises to allow:
 - 1. Yonkers City Schools occupancy.
 - 2. Work by Others.
 - 3. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by School District personnel:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage unless approved by the Owner..
- E. Contractors shall comply with Local Noise Ordinance. Work disrupting the community must be performed with the following hours:
 - 1. Monday thru Friday: 8 AM to 8 PM.
 - 2. Weekends/ Holidays: 9 AM to 6 PM.
- F. General: Limitations on site usage as well as specific requirements that impact utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements, the Contractor shall administer allocation of available space equitably among the separate sub contractors and other entities needing access and space, so as to produce the best overall efficiency in performance of the total work of the project. The Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.
- G. Only materials and equipment, which are to be used directly in the work, shall be brought to and stored on the project site by the Contractor. After equipment is no longer required for the work, it shall be promptly

removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractors.

- H. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary obtain and pay for such storage off-site.
- I. The Contractor(s) and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner, which may be withheld in the sole discretion of the Owner.
- J. Contractor shall ensure that the work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the work and all adjacent areas. The work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of:
 - 1. Any areas and buildings adjacent to the site of the work or;
 - 2. The Building in the event of partial occupancy as more..
- K. Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitations, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with the rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project Site, and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements, applicable to use, and occupancy of the Project Site and the Building.
- L. Maintain the existing building in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. When work is scheduled after hours clean and remove all temporary barriers and protection so that the building can be occupied the following day when normal building occupancy will occur.
- M. Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish or construction debris.
- N. Smoking, drinking of alcoholic beverages or open fires will not be permitted on the project site.
- O. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied, weekends, or holidays.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Yonkers and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.
 - 4. All costs for manning of temporary shutdowns and utility crossovers, including firewatch if needed is included in the contractor's bid, regardless of weekend, holiday, etc

1.10 OCCUPANCY REQUIREMENTS

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.

- B. Partial owner Occupancy: The Owner reserves the right to occupy the place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work, Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. The Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner occupancy.
 2. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
 3. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.
 4. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building.

1.11 DEFINITIONS

- A. A. Definitions as applied to “Contractors” involved with the work of this Project.
1. Contractor” or “Contractor” meaning that Respective Prime Contractor normally responsible for that work referenced;
 2. Prime Contractor” meaning either the - General Trades, Plumbing, HVAC or Electrical Contractors normally responsible for the referenced work;
 3. Contractor” meaning that Respective Prime Contractor as above; and such other terms relating to Contractors to be taken in context with respect to referenced work.
 4. Further, wherein said Division 0 and 1 and respective Sections therein, any reference is made to “General Contractor”, same shall be construed to mean “Contractor for the General Construction”.
 5. The Architect cannot guarantee the correctness of the existing conditions shown and assumes no responsibility therefore. It shall be the responsibility of the Contractor to visit the site and verify all existing conditions prior to bid.
- B. The Owner will purchase certain items required for the overall operation of this facility.
1. The Contractor(s) will cooperate with said vendors as may be necessary to permit the work to be accomplished.
 2. The cooperation may extend to the receiving, unloading and placement of said equipment if directed by the Owner.
 3. Terms of payment, if any, shall be in accordance with Article 7 of the General Conditions as amended or modified.
- C. The Contractor is advised that the Owner may enter into separate contracts as may be in their best interests.
- D. The Contractor is further advised that there will be a full time on-site Project Representative/ Construction Manager, whose duties will be defined at the pre-construction meeting.

1.12 ADDITIONAL SECURITY PROVISIONS (See Section 01565 - Security Measures For More Information)

- A. All Contractors' employees shall use a single means of access and egress, except in the case of emergency, to be designated by the Construction Manager.
- B. Each Contractor and each Subcontractor, while on the job site, must wear, in a conspicuous location, a Photo I.D. badge bearing the name of the Contractor. The badges of each Contractor shall be numbered consecutively.

1.13 ASBESTOS AND LEAD PAINT AWARENESS REQUIREMENTS

- A. Contractor agrees not to use or permit the use of any asbestos containing material in or on any property belonging to the Owner.

- B. For purposes of this requirement, asbestos free shall mean free from all forms of asbestos, including - actinolite, amosite, anthrophyhllite, chrysotile, cricidolite and tremolite, both in friable and non-friable states and without regard to the purposes for which such material is used.
- C. Reference Sections 01 2100 and 02 2080 of these documents for procedures and protocols to be followed in the event of discovery of asbestos or lead paint contamination.
- D. Contractors will investigate / verify then carefully demolish existing ceiling items so as not to disturb any asbestos containing fittings and / or insulation which may be located above existing ceilings.

1.14 CONSTRUCTION TIME AND PHASING REQUIREMENTS

- A. The Contractor is advised the “time is of the essence” of the Contract as defined in Article 8 of the “General Conditions” for the completion of the construction of the facility. It is understood that the work is to be carried through to completion with the utmost speed consistent with good workmanship. Time of Completion shall be as established in the Milestone Schedule. Further, safe and legal ingress and egress shall be maintained at all times to and through the occupied portions of the construction site.
- B. Work shall proceed in such a manner as to cause the least amount of disruption to the ongoing operations as possible.
- C. Upon request by the Contractor, the building may be made available, at the discretion of the Owner, and at the Cost to the Contractor, during such times as are allowed by local noise ordinance, in addition to the above listed hours. A request for use during these off-regular hours must be made at least two (2) days before the use. Such off-hours may include Saturdays, and Holidays.
- D. If the Contractor requests the use of the facility for off-hours to maintain the scheduled completion date, the Contractor shall pay all additional costs in connection with opening, providing security and project management expenses incurred with no costs to the Owner. All expenses shall be deducted from the Contractors contract price. Comply with other portions of this Section.
 - 1. Weekend, Holiday and Night Work:
 - a. The contractor shall make no claim for delay for the inability of the Owner to make the site available for off-hours work. Should the Owner make the site available during these hours at the contractor's request, the cost will be borne by the Contractor.
- E. THE CONTRACTOR SHALL BE REQUIRED TO PERFORM SCHEDULED WORK WITHIN THE EXISTING BUILDING ONLY DURING THE TIME PERIODS INDICATED AND SHALL INCLUDE IN THE BID ALL COSTS FOR LABOR, MATERIAL, ETC. INCLUDING PREMIUM TIME TO PERFORM THE WORK, PER PHASE PER TIME PERIOD.
 - 1. All work and storage areas shall be completely enclosed by a fence or barricade at all times so that no student or the public can approach the area or the equipment. The Contractor shall maintain fences and barricades at all times and shall:
 - 2. Repair/ restore and/ or pay for any temporary fencing damaged by their work.
 - 3. Maintain at all times, all exits and walkways from the Building.
 - 4. Where the barricade is removed for work, the Contractor performing such work shall provide adequate safety personnel to prevent unauthorized persons from approaching the work area.

1.15 CONSTRUCTION PHASING

- A. The phasing and/ or milestone schedule contained in the contract has been established for the overall construction of the project.
- B. The Contractor is advised that areas of the existing buildings which are to be added to and / or altered under this Contract will remain in use during construction, coordinate with Section 01500 for temporary facilities.
- C. Electrical and mechanical services to the functioning spaces shall be maintained at all times.
- D. Swing-overs to new facilities shall be made so as to cause the least interruption to the facilities' operations.

- E. Limit utility shutdowns to two consecutive non-school work days including weekends or holidays at no additional cost to the Owner unless prior agreement is made with the operating personnel of the facility.
- F. The Contractor shall provide and maintain all required separations between old and new construction to prevent:
 - 1. Unauthorized entrance to construction areas by others than Architect, Construction Manager or Owner.
 - 2. Heat loss from existing buildings.
 - 3. Water (rain or ground water) infiltration into existing building.
- G. Exterior alteration and restoration, as requires, may proceed outside of phasing schedule at the Contractor's option with concurrence from the Architect, Construction Manager and Owner.
- H. Site development work shall proceed in such a manner to cause the least amount of disruption to the ongoing operations as possible.

1.16 PROOF OF ORDERS AND DELIVERY DATES - COORDINATE WITH SECTION 01300.

- A. Within 2 weeks after the approval of shop drawings, samples, product data and the like, the Contractor shall provide copies of purchase orders for all equipment and materials which are not available in local stock. The Contractor shall submit written statements from suppliers and subcontractors confirming the orders and stating promised delivery dates. Failure to provide this critical information will result in withholding monthly requisition payments until received.
- B. This information shall be incorporated within the progress schedules so required as part of Section 01300 and shall be monitored so as to insure compliance with promised dates.

1.17 FIELD MEASUREMENTS

- A. Each Respective Contractor shall take all necessary field measurements prior to fabrication and installation of work and shall assume complete responsibility for accuracy of same.
- B. This project is an ALTERATION and therefore necessitates additional attention to existing conditions receiving newly fabricated and installed equipment, i.e. note the requirements for field dimensioning of shop fabricated items whether or not so required by each technical section.

1.18 INITIAL SUBMITTAL REQUIREMENTS

- A. Each Contractor shall provide items noted including - bonds, insurance, emergency telephone numbers, progress scheduling, schedules of submittals, subcontractor listings and the like prior to the start of any work.

1.19 SCHEDULES

- A. The schedule presented in the documents is for bidding and identification of milestones. Due to the nature of the work, it is the intention of the Construction Manager to coordinate actual work periods and tasks / sequencing for the project among the various Prime Contractors involved with this bidding process, as well as separate contractors involved with other phases of the work solicited under separate proposals. Each Contractor shall, under terms of the General Conditions, mutually cooperate in the rescheduling of work to permit an uninterrupted use of the facilities by the Owner, without additional cost to the Owner.
 - 1. General
 - a. The objective of this project is to complete the overall work in the shortest period of time and to protect the building and occupants from damages caused by weather and construction activity during the progress of the work.
 - b. To meet these objectives, the Contractor shall plan the work, obtain materials, and execute the construction in the most expeditious manner possible in accordance with the requirements listed below.
 - c. If the Contractor fails to expedite and pursue any part of the work, the Owner may terminate the contract as per the General Conditions.

- d. The Contractor shall work in coordination with work of other Contractors and with school activities with special attention to noise, dust, safety and other contract requirements for work in and around the occupied buildings.

1.20 ADDITIONAL REQUIREMENTS

- A. The following are additional general and special requirements which will govern the work of the projects covered by these Documents.
 1. If it appears that some of the work cannot be completed by the scheduled date, the Contractor shall increase the work force or increase the hours of work, including evenings and weekends or necessary, at no additional cost to the Owner.
 2. If the work is complete but the area is not cleaned and debris or equipment is not removed, the Owner shall have the right to prepare the area for occupancy with his own forces and deduct the costs from the Contract Amount. (If Contractor does not respond within 24 hours' notice).
 3. If the Contractor fails to staff the job adequately to meet the completion date, the Owner reserves the right to assume possession of the material and complete installation with the Owner's forces or other Contractors or to require the Contractor to work evenings and weekends.
 4. The school can be made available on weekends and evenings to allow the Contractor adequate time to complete the work before final completion date. Any custodial on-site Construction Manager Field Superintendent, security costs at their contractual rate resulting in this after hours scheduling will be the Contractor's responsibility.
 5. In addition to the above-stated requirements for phasing of the work, the Contractors shall not do any noisy work in the areas where examinations will be conducted as per the published school calendar.
 6. Work in each work period shall progress at least at a pace in proportion to the Contract time available.
 7. The Contractor is responsible for temporary protection of all work until acceptance.
 8. The school will be closed on Saturdays, Sundays, regularly scheduled district holidays, and at night after cleaning crews have finished.
 9. If any contractor wishes to work at any time when the school is normally closed, that Contractor shall arrange and pay for custodial services for the building at the applicable district pay rates.
 10. All existing conditions must be verified in the field. The Owner takes no responsibility for actual conditions found deviating from the drawings. If existing condition interferes with contract work, contractor is responsible to eliminate this condition.
 11. Contractor must plan, provide and maintain his own access, ramping, and egress as required into and out of the site, staging of trailer(s), materials, machinery, and equipment in agreement with the Construction Manager's Superintendent. Maintain free and safe access on the jobsite for other related project personnel. Maintain safe pedestrian or vehicular traffic must be regulated by a flagman. Trucking and delivery operation should be coordinated with Construction Manager's Superintendent and all other trades.
 12. Contractor is responsible for all work shown on Contract Documents, including drawings of other trade disciplines. For example, the HVAC Contractor will be responsible for HVAC work shown on Architectural Drawings.
 13. Contractor is responsible to maintain existing site fencing in its existing condition. Modifications to the fence to better accommodate the contract work can be discussed with the Construction Manager. These changes shall then be handled by this contractor at his expense and in accordance with the Construction Manager's Superintendent's direction. Any cost incurred as a result of damages shall be charged to this contractor.
 14. Time is of the essence. Contractors' proposed schedule must be approved by the Construction Manager. Contractor shall indicate significant events such as submittals, shop drawings, material ordering, fabrication, delivery, coordination precedents, installation, testing and turnover by area

- or system as agreed with Construction Manager. A revised progress status shall be required on a weekly basis.
15. Decisions required from the Construction Manager, Architect and/or Engineer, shall be anticipated by the Contractor to provide ample time for inspection, investigation or detailed drawings.
 16. Contractor shall limit his operations including storage of materials and prefabrication to areas within the Contract Limit Lines unless otherwise permitted by the Construction Manager at the Owner's option.
 17. Contractor shall coordinate the use of premises with the Owner and Construction Manager and shall move at his own expense any stored products under Contractor's control, including excavated material, which interfere with operations of the Owner or separate contractors.
 18. Contractor shall obtain and pay for the use of additional storage of work areas needed for operations.
 19. Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract stored on the site and shall cooperate with the Construction Manager to insure security for the Owner's Property.
 20. The intention of the work is to follow a logical sequence; however, the Contractor may be required by Construction Manager to temporarily omit or leave out any section of his work, or perform his work out of sequence. All such out of sequence work and come back time to these areas shall be performed at no additional cost.
 21. Contractor shall submit a three-week schedule (man-loaded by work activity and area) to Construction Manager each week. Contractor's representative shall attend a weekly meeting with all contractors, chaired by Construction Manager, for the purpose of job coordination and sequencing. Contractor is responsible to coordinate the job with other trades and Construction Manager, and to cooperate with other trades in pursuit of the overall project's shop drawings and actively participate in resolving discrepancies, conflicts, interferences, etc.
 22. Prime Contractor shall prepare an overall job schedule for his portion of work upon award of Contract, as per Construction Schedules.
 23. Sufficient manpower shall be provided at all times to maintain progress of the job. A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the job.
 24. The contractor shall take special care in verifying that his equipment matches the characteristics of the power being supplied.
 25. Insubordination, unsafe practices, horseplay, abusive behavior or language, wanton destruction of property, use of drugs or alcohol, possession of firearms, and solicitation shall not be tolerated. There will be no warnings, and Contractor shall designate a responsible on-site supervisor to handle any situations that may arise, including termination.
 26. Each contractor is responsible to supply and install all wood blocking/bracing necessary to properly secure their work. This responsibility includes coordinating the installation in concealed areas without delaying other trades.
 27. Union business shall not be conducted on site. Any Union representatives that visit the site must declare what Contractor's personnel they represent, and must be escorted by that Contractor's Union steward at all times. No visitors, sales representative or non-working personnel shall be permitted on site without prior consent of the Construction Manager. No photographs shall be taken without the Construction Manager's prior approval. The contractor shall insure that it's work continues uninterrupted during any labor dispute regardless of cause. The contractor shall be liable to the owner for all damages suffered by the disputes or strikes.
 28. Organize daily clean ups as well as participating in a weekly joint clean up involving all prime contractors on site. Clean up shall be considered a safety issue. If any contractor fails to keep the site safe and clean within 4 hours of being notified by the construction manager, either verbally or in writing, the construction manager will have the clean up work performed by others and will backcharged accordingly.

29. Contractor shall provide protection from damage to adjacent and adjoining work and/or structures. Contractor shall clean, repair and/or replace any damage for which this contractor is responsible.
30. Contractor shall submit hourly rate sheets that would apply to time and material work for all pertinent trades upon Award of Contract.
31. Contractor shall examine surfaces and conditions prior to start of work. Report unacceptable conditions to the Construction Manager. Do not proceed until unacceptable conditions are corrected and acceptable. Starting of work implies acceptance.
32. Upon removal of exterior walls and window units, the building security and weather protection is the responsibility of the prime contractor performing the removals.
33. It is the responsibilities of all Prime Contractors to review the entire summary of work and remaining documents for additional work items.
34. SLEEVES AND SLEEVE LAYOUT - It is the responsibility of the Prime Contractor requiring a sleeve to provide the sleeve and a layout sketch to the Prime Contractor performing the construction activity that the sleeve goes in.
35. Each contractor is responsible to review and become familiar with the scope of work included in all Contracts.
36. Limited site space is available in areas as designated by the Construction Manager. Construction trade parking is not permitted in Owner's employee parking lot.
37. Each contractor shall provide the engineering layout required to properly complete his work from an established working point. Contractor shall employ only competent engineering personnel skilled in performing layout tasks of similar complexity.
38. Prior to commencing the work, each Contractor shall provide written acceptance of grades, structures, substrates, and/or systems installed by other Contractors as suitable for installation of his work. Failure to provide this verification prior to commencing work shall constitute acceptance of the existing conditions.
39. Each Contractor shall coordinate with the Construction Manager for lay down areas, staging areas, and overall use of project site.
40. All contractors and their employees, subcontractors and supplier are expressly prohibited from entering the occupied areas of the school buildings during school hours without prior written permission of the Construction Manager and for using any of its facilities (i.e. restrooms, cafeteria, etc.).
41. Each contractor is responsible for the timely provision of the information required by other Contractors for the progress of other Contractors' work.
42. Electrical contractor is required to coordinate / obtain the necessary electrical roughing and final inspections. Provide proper certification paperwork.

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Procedures for preparation and submittal of application for payments.

1.3 RELATED REQUIREMENTS

- A. Article 28 Partial Payments and Article 79 Payments of the General Engineering Agreement for additional requirements.
- B. Article 47 General Engineering Agreement for allowances requirements, if any.
- C. Section 01 5000 - Temporary Facilities and Controls.
- D. Section 01 7800 - Closeout Submittals for additional requirements for Final Payment.
- E. Section 01 2100 - Allowances: Payment procedures relating to allowances.
- F. Section 01 2300 - Alternates for bid alternates.
- G. Section 01 7800 - Closeout Submittals: Additional requirements for project record documents.

1.4 SCHEDULE OF VALUES

- A. Form to be used: AIA G702/703.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Fuller and D'Angelo, P.C. for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in PDF Format within 10 days after date Letter of Intent to Award.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify Bonds and Sub-contractors.
- F. Include in each line item, the amount of each Allowances specified. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Revise schedule to list approved Change Orders, with each Application For Payment.
- H. Sub-schedules: Where the Work is separated into phases provide separate payment applications, or provide sub-schedules showing values correlated with each phase.
 - 1. For public school projects identify each application with the SED Project number for each phases and YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s project number.
- I. Provide a separate line item for the following: (where applicable)
 - 1. Bonds. (Bond premium may be paid when invoice of premium is provide).
 - 2. Labor and materials, when payment is anticipated for material not installed.
 - 3. Submittals. (1% Minimum of contract amount).
 - 4. Each allowance.
 - 5. Meeting attendance.
 - 6. As-built Drawings.

7. Testing, HVAC balancing reports. Minimum 0.5% of contract amount.
8. Punch list.
9. Final Cleaning.
10. Closeout Documents (1% Minimum of contract amount).
11. Authorized change orders.

1.5 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement but not more than one per month.
- B. Form to be used: Approved Schedule of Values form.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
 1. Item Number.
 2. Description of work.
 3. Scheduled Value.
 4. Previous Applications.
 5. Work in Place and Stored Materials under this Application.
 6. Authorized Change Orders.
 7. Total Completed and Stored to Date of Application.
 8. Percentage of Completion.
 9. Balance to Finish.
 10. Retainage.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one (1) electronic "pencil copy", in PDF format, of each Application for Payment to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for approval.
- I. After Architect's approval of the "pencil copy" submit three hard copies of approved Application for Payment to YPS Office of Facilities Management.
- J. Include the following with each application:
 1. Transmittal letter as specified for submittals in Section 01 3000.
 2. Construction progress schedule, revised and current as specified in Section 01 3216.
 3. Partial Waivers of Mechanic's Lien: With each Application for Payment, submit partial waivers of mechanic's liens from Contractor, subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - a. Waiver Forms: Submit waivers of lien on forms, provided by the Architect in Section 01 2005.
 4. When an application shows completion of an item, submit final or full waivers.
 5. Submit Final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 6. Certified Payrolls: All Applications for Payment must be accompanied with certified payrolls for all Contract Work performed. **Each contractor and sub-contractor shall submit to the Owner within thirty days after issuance of its first payroll, and every thirty days thereafter, a transcript of the original payroll record subscribed and affirmed as true under penalties of perjury. The Owners shall be required to receive and maintain such payroll records. The original payrolls**

or transcripts shall be preserved for three years from the completion of the work on the awarded project.

- a. Submit certification that all personnel listed on certified payrolls have successfully completed an OSHA construction safety and health course of at least 10 hours prior to performing any work on the project.
- K. Liens: No Payment will be made when a lien is filed against Owner by contractor or any subcontractor, or supplier or other entities until such lien is removed, bonded or similar action acceptable to the Owner
- L. Project record documents as specified in Section 01 7800 - Closeout Submittals, shall be available for review by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. as a prerequisite for approval of payment.
- M. Payment for stored materials, whether on-site but not installed, or stored in secured warehouse) will require a bill of lading showing the exact value. In no case will more than 90% be approved if the item is not installed. Insurance certificates will be provided specific to materials stored for on-site or offsite items.
- N. When YPS Office of Facilities Management or Fuller and D'Angelo, P.C. requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- O. The Owner shall retain Five (5) percent of the amount of each payment.

1.6 INITIAL APPLICATION FOR PAYMENT:

- A. Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. Executed contract.
 2. Approved bonds.
 3. Approved insurance certificates.
 4. Names of full time project manager, on site superintendent, and foreman.
 5. Approved Schedule of Values.
 6. Contractor's Construction Schedule (preliminary if not final).
 7. Contractor's Submittal Schedule.
 8. Emergency Phone Numbers and Contacts.
 9. Health and Safety Manual.

1.7 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

- A. Comply with Requirements of Section 01 7800 - Closeout Submittals.

1.8 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in its employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, YPS Office of Facilities Management will issue instructions directly to the Contractor.
- C. For other required changes YPS Office of Facilities Management will issue a document signed by YPS Office of Facilities Management instructing the Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- D. YPS Office of Facilities Management may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time

for executing the change . The Contractor shall prepare and submit a fixed price quotation within ten (10) days.

- E. Contractor may propose a change by submitting a request for change to YPS Office of Facilities Management, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 25000.
- F. Computation of Change in Contract Amount:
 - 1. Refer to Article 21 and 22 of General Engineering Agreement.
- G. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
 - a. If the contractor is directed to perform work on a "Time and Material" basis he will notify the YPS Office of Facilities Management prior to starting and will present an itemized T&M sheet daily for YPS Office of Facilities Management signature at the end of the shift. No payments will be made for any T&M work without daily signed worksheets.
- H. Execution of Change Orders: YPS Office of Facilities Management will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.9 APPLICATIONS FOR PAYMENT WHEN BEHIND SCHEDULE

- A. When the project falls behind schedule the contractor shall demonstrate the actions to be taken to put the project back on schedule.
 - 1. Payments will not be approved until satisfactory evidence is presented to put the project on schedule.

1.10 APPLICATION FOR PAYMENT AFTER SCHEDULED COMPLETION DATE

- A. In the event the work is not completed by the schedule date, listed in Agreement and in addition to the other remedies described, the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. will not review progress payment requisitions submitted after the construction completion date, and the District will not issue any progress payments after that date, until all work is completed.

1. Only one requisition for work performed, after the construction completion date, may be submitted, and it may be submitted only when all work is complete and a Punch List inspection is conducted; said requisition may be submitted when the work at 100% complete, less 5% retainage.

1.11 APPLICATION FOR FINAL PAYMENT

- A. Refer to General Engineering Agreement and the following:
- B. Comply with Section 01 7800 - Closeout Submittals.
- C. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Application for Final Payment will not be considered until the following have been accomplished:
 1. All closeout procedures specified in Section 01 7800 - Closeout Submittals are submitted and approved.
 2. All Substantial Completion Inspection Lists (Punch List) items have been completed.

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meetings.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Contractor's daily reports.
- F. Coordination drawings.
- G. Submittals for review and information.
- H. Number of copies of submittals.
- I. Requests for Interpretation (RFI) procedures.
- J. Submittal procedures.

1.3 RELATED REQUIREMENTS

- A. General Engineering Agreement.
- B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01 6000 - Product Requirements: General product requirements.
- D. Section 01 3553 - Site Safety and Security Procedures.
- E. Section 01 7000 - Execution: Additional coordination requirements.
- F. Section 01 7800 - Closeout Submittals:
- G. Section 01 9113 - General Commissioning Requirements:

1.4 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.

10. Substantial Completion Inspection Correction Report and Final Correction Report.
11. Closeout submittals.

1.5 PROJECT COORDINATOR

- A. Project Coordinator: YPS Office of Facilities Management.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other Contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation
- C. Coordinate installation of different components with other contractors and/or subcontractor to ensure maximum accessibility for required maintenance, service, and repair
- D. Cooperate with the Project Coordinator in allocation of mobilization areas of site, access, traffic, parking facilities, and field offices.
- E. During construction, coordinate use of site and facilities through the Project Coordinator.
- F. Comply with YPS Office of Facilities Management and Fuller and D'Angelo, P.C. procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- G. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 5000 - Temporary Facilities and Controls.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. YPS Office of Facilities Management will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. YPS Office of Facilities Management.
 2. Fuller and D'Angelo, P.C.
 3. Consultants.
 4. Contractor(s) and field superintendent(s).
- C. Agenda:
 1. Status of Yonkers Public Schools - Contractor(s) Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 5. Submission of initial Submittal schedule.
 6. Designation of personnel representing the parties to Contract: YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Contractor(s), .
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling.
 9. Use of premises by Contractor(s).
 10. Yonkers Public Schools's requirements and occupancy prior to completion.
 11. Construction facilities and controls provided by YPS Office of Facilities Management.
 12. Temporary utilities provided by YPS Office of Facilities Management.
 13. Survey existing facilities prior to starting construction.
 14. Survey and site layout.

15. Security and housekeeping procedures.
 16. Procedures for testing.
 17. Procedures for maintaining record documents.
 18. Requirements for start-up of equipment.
- D. Fuller and D'Angelo, P.C. will record minutes and distribute copies within five days after meeting to all participants. Contactor shall distribute to all entities of the Contractor affected by decisions made.

3.2 PROGRESS MEETINGS

- A. YPS Office of Facilities Management and Fuller and D'Angelo, P.C. will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
1. Meetings will be scheduled throughout progress of the Work at minimum of two week intervals.
- B. Attendance Required:
1. Contractor(s).
 2. YPS Office of Facilities Management
 3. Fuller and D'Angelo, P.C.
 4. Consultants.
 5. Contractor's Superintendent.
 6. Major Subcontractor and suppliers as appropriate to agenda topics for each meeting.
- C. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.
 7. Review of delivery schedules.
 8. Review construction safety programs.
 9. Review exiting and separation of construction
 10. Maintenance of progress schedule.
 11. Corrective measures to regain projected schedules.
 12. Planned progress during succeeding work period.
 13. Coordination of projected progress.
 14. Maintenance of quality and work standards.
 15. Effect of proposed changes on progress schedule and coordination.
 16. Other business relating to work.
- D. Fuller and D'Angelo, P.C. will record minutes and distribute copies within five after meeting to all participants. Contactor(s) shall distribute to all entities of the Contractor affected by decisions made.

3.3 WEEKLY COORDINATION MEETINGS

- A. The Contractor for General Construction shall schedule and hold weekly general project coordination meetings at regularly scheduled times that are convenient for the attendance of other prime contractors and other parties involved. These meetings are in addition to specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Required attendance includes General Construction Contractor, HVAC, Plumbing, and Electrical Contractor and every other entity identified by any prime contractor as being currently involved the coordination or planning for the work of the entire project. Conduct meetings in a manner that resolve coordination problems. The Contractor for General Construction shall preside at each meeting, and shall record meeting results. The Contractor for General Construction shall distribute copies of the meeting result to everyone in attendance, the YPS

Office of Facilities Management and Fuller and D'Angelo, P.C. and to others affected by the decisions and actions resulting from each meeting.

- B. The Prime Contractors shall schedule and hold weekly general project coordination meetings with the YPS Office of Facilities Management, to review the work schedule for the week in order to insure the planned work does not conflict with facility operations.

3.4 CONSTRUCTION PROGRESS SCHEDULE - See Section 01 3216

3.5 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. Transmit electronically a copy to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
- C. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 - 1. Date.
 - 2. High and low temperatures, and general weather conditions.
 - 3. List of subcontractors at Project site.
 - 4. List of separate contractors at Project site.
 - 5. Approximate count of personnel at Project site.
 - a. Include a breakdown for supervisors, laborers, journeymen, equipment operators, and helpers.
 - 6. Major equipment at Project site.
 - 7. Material deliveries.
 - 8. Safety, environmental, or industrial relations incidents.
 - 9. Meetings and significant decisions.
 - 10. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (listed in most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
 - 11. Testing and/or inspections performed.
 - 12. Signature of Contractor's authorized representative.

3.6 PROOF OF ORDERS AND DELIVERY DATES

- A. Within two (2) weeks after the approval of shop drawings, samples, product data and the like, the Contractor(s) shall provide copies of purchase orders for all equipment and materials which are not readily available in local stock. The Contractor(s) shall submit written statements from suppliers confirming the orders and stating promised delivery dates. Dates shall be indicated and coordinated with the Construction Schedule.

3.7 COORDINATION DRAWINGS

- A. Provide information required for preparation of coordination drawings.
- B. Review drawings prior to submission to Fuller and D'Angelo, P.C.
- C. Indicate all HVAC equipment, ductwork, and major piping, including elevations and dimensions to all fixed building elements, such as beams; columns; slabs; ceilings, including ceiling suspension; framing; floors; walls; doors, including door swings; and windows affected by the equipment, ductwork, and piping.
- D. Indicate all existing and proposed lighting fixtures and smoke detectors.
- E. Show location of all valves, dampers (fire, smoke, volume, and automatic), coils, humidifiers, smoke detectors, etc. requiring access for service and maintenance.
- F. Show all registers, grilles, diffusers, radiators and convectors, and other terminal elements.

- G. Locate all access doors.
- H. Include large-scale details and sections as required to fully delineate the conditions in congested areas, leaving space for the work of the other trades.
- I. Show plan layout of all equipment and anchorage and fasteners

3.8 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - c. Prepare RFI using form in Section 00 2115 - RFI Form.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions refer to Section - 01 2500 - Substitution Procedures
 - 2. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 - 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Yonkers Public Schools reserves the right to assess for the costs (on time-and-materials basis) incurred by the Fuller and D'Angelo, P.C., and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
- H. Review Time: Fuller and D'Angelo, P.C. will respond and return RFIs within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to

Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to YPS Office of Facilities Management.

1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
2. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
3. Notify Fuller and D'Angelo, P.C. within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.9 SUBMITTAL SCHEDULE

- A. Submit to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for review a schedule for submittals in tabular format.
 1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 2. Coordinate with construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

3.10 SUBMITTALS FOR REVIEW

- A. All submittals are the product and the property of the Contractor. The YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Consultant shall not be responsible for the contractor's construction means, methods or techniques; safety precautions or programs; Acts or admissions; or failure to carry out the work in accordance to the contract documents
- B. Refer to "Article 76 General Engineering Agreement Shop Drawings, Product Data and Samples" for additional requirements.
- C. Shop Drawing Submittal Log no later than ten (10) days after award of contract.
- D. Shop Drawing Submittals shall be submitted no later than twenty (20) days after Letter of Award of Contract. No further payments will be made to the contractor after twenty (20) until all major submittals are made.
- E. When the following are specified in individual sections, including but not limited to the following, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Templates.
- F. Submit to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
 1. Submittals for HVAC, plumbing, electrical, structural, or others requiring consultant review submit directly to consultant with copy to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
- G. Samples will be reviewed only for aesthetic, color, or finish selection and for record documents purposes described in Section 001 7800 - Closeout Submittals.
- H. After review, provide copies and distribute in accordance with Submittal Procedures article below .

- I. The Architect shall review and approve or take other appropriate action on the Contractor submittals, such as shop drawings, product data, samples and other data, which the Contractor is required to submit, but only for the limited purpose of checking for conformance with the design concept and the information shown in the Construction Documents. This review shall not include review of the accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes, construction means or methods, coordination of the work with other trades or construction safety precautions, all of which are the sole responsibility of the Contractor. The Architect's review shall be conducted with reasonable promptness while allowing sufficient time in the Architect's judgment to permit adequate review. Review of a specific item shall not indicate that the Architect has reviewed the entire assembly of which the item is a component. **The YPS Office of Facilities Management and Fuller and D'Angelo, P.C. shall not be responsible for any deviations from the Construction Documents not brought to the attention of the Architect, in writing, by the Contractor.** YPS Office of Facilities Management and Fuller and D'Angelo, P.C. shall not be required to review partial submissions or those for which submissions of correlated items have not been received.
- J. Marking or comments on shop drawings shall not be construed as relieving the Contractor from compliance with the contract project plans and specifications, nor departure therefrom. The contractor remains responsible for details and accuracy for conforming and correlating all quantities, verifying all dimensions, for selecting fabrication processes, for techniques of assembly and for performing their work satisfactorily and in a safe manner.
- K. **Architect will review the original submittal and one (1) re submittal. Additional reviews will be additional services provided to the Owner and charged accordingly. The Owner will back charge the contractor accordingly.**
- L. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- M. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

3.11 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Inspection reports.
 - 4. Manufacturer's instructions.
 - 5. Manufacturer's field reports.
 - 6. Other types indicated.
- B. Submit for YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s knowledge as contract administrators. for. No action will be taken.

3.12 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Refer to Section 01 7800 - Closeout Submittals and General Engineering Agreement.

3.13 NUMBER OF COPIES OF SUBMITTALS

- A. Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. All submittals shall be in electronic format and conforming to the following:
 - 1. Each item shall be in a separate file.
 - 2. Each file name shall start with the specification section number and contain an abbreviated explanation of what it contains; for example:
 - a. 03 3000 Concrete; 07 5323 EPDM.pdf; 07 5323 Bond Adh.pdf; 07 7100 Drain.pdf; 07 7100 Hatch.pdf; 09900 Painting;

3. Add Revision number (Rev2 Rev3, etc) to the file name when resubmitting items, for example:
 - a. 07 5323 EPDM Revl.pdf 07 5323 Bond AdhRevl.pdf
 4. Do not zip the files, and do not put the files in Folders.
 5. Do not send MSDS with the technical submittals; collate all of the MSDS needed for the entire project in three ring binders, organized by specification section, and submit the binders to the YPS Office of Facilities Management, with copy of Transmittal to the Architect, and maintain one copy at the project site.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by YPS Office of Facilities Management.
1. After review, produce duplicates.
 2. Approved sample will be retained at the project site.
 3. Retained samples will not be returned to Contractor unless specifically so stated.
 4. Submit with each sample, in electronic PDF, data, cuts, photos, color, charts, etc.

3.14 SUBMITTAL PROCEDURES

- A. General Requirements:
1. Use a separate transmittal for each item attached to this section.
 2. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, without Contractor's stamp will not be acknowledged, reviewed, or returned.
 3. All submitted shop drawings shall be stamped and signed by the Contractor with the following note:
 - a. "We the undersigned certify that we have reviewed and coordinated this shop drawing and they are in conformance to the plans, specifications, applicable codes and other provisions of the Contract Documents."
 4. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Deliver submittals to YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Consultant at e-mail address.
 5. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Fuller and D'Angelo, P.C.'s consultants, Yonkers Public Schools, or another affected party, allow an additional 7 days.
 6. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 7. Provide space for Contractor and YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Consultant review stamps.
 8. When revised for resubmission, identify all changes made since previous submission.
 9. Submittals not requested will not be recognized or processed.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
- E. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

3.15 SUBMITTAL REVIEW

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Submittals for Review: Fuller and D'Angelo, P.C. will review each submittal, and approve, or take other appropriate action.
- C. Submittals for Information: Fuller and D'Angelo, P.C. will acknowledge receipt and review. See below for actions to be taken.
- D. Fuller and D'Angelo, P.C.'s actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

3.16 ARCHITECT'S ACTION

- A. Fuller and D'Angelo, P.C.'s and Consultants' actions on items submitted for review:
1. Final Unrestricted Release: The work covered by the submittal may proceed provided it complies with the requirements of the contract documents; acceptance of the work will depend upon that compliance.
 - a. "No Exception Taken".
 2. Final-But-Restricted Release: When the submittals are marked as follows, the work covered by the submittal may proceed provided it complies with both the Architect's/Engineer's notations or corrections on the submittal and with the requirements of the contract documents; acceptance of the work will depend on that compliance.
 - a. "Make Corrections Noted" Resubmission not required.
 3. Returned for Re-submittal: When the submittal is marked as follows, do not proceed with the work covered by the submittal, including purchasing fabrication, delivery or other activity. Revise the submittal or prepare a new submittal in accordance with the Architect's/Engineer's notations stating the reasons for returning the submittal; resubmit the submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the following marking to be used at the project site, or elsewhere where work is in progress.
 - a. "Revise and Resubmit".
 - b. "Rejected".
 - a) Submit item complying with requirements of Contract Documents.
 - c. "Submit Specified Item".
- B. Fuller and D'Angelo, P.C.'s actions on items submitted for information:
1. Items for which no action was taken:
 - a. "Examined and Reviewed" - to notify the Contractor that the submittal has been received for record only.

SUBMITTAL COVERSHEET

Yonkers Public Schools

Windows, Masonry & Site Improvements,

Westchester Hills School 29

ARCHITECT:

Fuller and D'Angelo, P.C.

45 Knollwood Rd.

Elmsford, NY10523

OWNER:

Yonkers Public Schools

One Larkin Center

Yonkers, NY 10701

CONTRACTOR: _____ **CONTRACT:** _____

ADDRESS: _____

TELEPHONE: _____ **FAX:** _____ **EMAIL:** _____

Facility Name: Westchester Hills School 29

Type of Submittal: Re-submittal: ☐ No ☐ Yes

☐ Shop Drawings ☐ Product Data ☐ Schedule ☐ Sample
☐ Test Report ☐ Certificate ☐ Color Sample ☐ Warranty

SUBMITTAL DESCRIPTION: _____

PRODUCT NAME: _____

MANUFACTURER: _____

SUBCONTRACTOR/ _____

SUPPLIER: _____

SPEC. SECTION NO.: _____ **DRAWING NO(S):** _____

PARAGRAPH: _____ **RM. OR DETAIL NO(S):** _____

CONTRACTOR'S REVIEW STAMP

Contractor Review Statement: These documents
have been checked for accuracy and coordinated
with job conditions and Contract requirements by
this office and have been found to comply with the
provisions of the Contract documents.

Remarks:

NAME: _____ **DATE:** _____

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.3 RELATED SECTIONS

- A. Section 01 1000 - Summary of Contract: Work sequence.
- B. Section 01 1010 - Milestone Schedule.
- C. Section 01 3000 - Administrative Requirements.

1.4 REFERENCE STANDARDS

- A. Article 5 General Engineering Agreement for additional requirements.
- B. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

1.5 RESPONSIBILITY

- A. Each Contractor shall develop a full schedule, in sufficient detail and clarity of form and technique so that the contractor can plan and control his work properly and the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. can readily monitor and follow the progress for all portions of the work. Each Contractor shall complete the detailed schedule within 10 days after contract award.
 - 1. Identify all long lead items and dates required on site.
 - 2. In the event of conflict YPS Office of Facilities Management and Fuller and D'Angelo, P.C. shall resolve a provide direction which is in the best interest on the Owner.
- B. Each Contractor shall coordinate their work with work of all prime contractors.
- C. The General Construction Contractor shall be responsible for incorporating all schedules, of all prime contractors, and prepare a full master schedule, and updates, as required or directed by the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. Each Contractor shall coordinate their work with work of the other prime contracts.
 - 1. In the event of conflicts the YPS Office of Facilities Management shall resolve and provide direction which is in the best interest on the District.
 - 2. Identify all long lead items and dates required on site.
- D. The activities identified in the schedule shall be analyzed in detail to determine activity time durations in units of whole working days. All duration's shall be the result of definitive manpower and resource planning by the Contractor.
- E. The activity data shall include activity codes to facilitate selection, sorting and preparation of summary reports and graphics. Activity codes shall be developed for:
 - 1. Area: Subdivision of the building(s) and site(s) into logical modules or blocks and levels. Pods A, B, C and D.
 - 2. Responsibility: Contractor or subcontractor responsible for the work.
 - 3. Specifications: 16 Division CSI format.

4. System: Division of the work into building systems for summary purposes.
5. Milestone: Work associated with completion of interim completion dates or milestones
6. Pay Item: Work identified with a pay item on the Schedule of Values.

1.6 SUBMITTALS

- A. After the Letter of Award, as scheduled in the Milestone Schedule each Contractor shall submit to the General Construction Contractor a preliminary schedule with copies to YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- B. Within ten (10) days after date Notice of Award, submit preliminary schedule .
- C. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- D. Within 5 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 1. Include written certification that all Prime Contractors have reviewed and accepted proposed schedule.
- E. Within 10 days after joint review, the General Construction Contractor submit completed master schedule.
- F. The General Construction Contractor shall submit updated master schedule with each Application for Payment based upon update information provide by Each Contractor.
- G. Submit in PDF format.
- H. Submit under transmittal letter form specified in Section 01 3000 - Administrative Requirements.
- I. The Contractor(s) are hereby notified that payment requisitions will not be processed by the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. nor paid by the Owner until all schedules are reviewed and approved by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. .

1.7 QUALITY ASSURANCE

- A. Scheduler: Contractor 's personnel or specialist Consultant specializing in construction scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: 3 years minimum experience in using and monitoring Bar Chart schedules on comparable projects.

1.8 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each phase and each activity. Identify each activity with the applicable specification section number.
- B. Submit schedule in electronic PDF format.
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.
- B. Based on the preliminary development of the progress schedule and on feedback from YPS Office of Facilities Management and Fuller and D'Angelo, P.C. or whatever updating may have occurred during the project start-up, the Contractor shall, for the entire work of the contract, prepare the Master Schedule, secure critical time commitments for performing major elements of all the work.

3.2 GENERAL CONTENT.

- A. Each prime contractor shall prepare a schedule for their work.

- B. Milestones: Include milestones in schedule, including, but not limited to, Notice of Award, Submittals, Verification of existing conditions, Removals, Installation, Substantial Completion Inspection, (Punch List), Final Substantial Completion Inspection, and Closeout
- C. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- D. Identify each item by specification section number.
- E. Identify work of separate floors and other logically grouped activities.
- F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- G. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with YPS Office of Facilities Management and Fuller and D'Angelo, P.C. at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 5 days.
 - 1. When project work is behind schedule indicate revisions required to put the project on schedule.
 - 2. Payments will not approved until satisfactory evidence is presented to put the project on schedule.

3.5 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Update diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.6 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to YPS Office of Facilities Management , Fuller and D'Angelo, P.C., Contractor's site files, subcontractors, and major suppliersand other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 3307
SED SPECIAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SUMMARY

- A. This Section specifies special requirements of State Education Department, including Commissioner's Regulation Part 155.5, 155.7
 - 1. Copies of Commissioner's Regulation Part 155.5, 155.7 are available on the State Education Department's web site. www.p12nysed.gov
 - 2. Copy of Commissioner's Regulation Part 155.5 is included as Appendix to the specification.

1.3 CERTIFICATE OF OCCUPANCY

- A. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a Certificate of Occupancy.

1.4 GENERAL SAFETY AND SECURITY DURING CONSTRUCTION

- A. All construction materials shall be stored in a safe and secure manner.
- B. Fences around construction supplies or debris shall be maintained.
- C. Gates shall always be locked unless a worker is in attendance, to prevent unauthorized entry.
- D. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
- E. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites.

1.5 SEPARATION OF CONSTRUCTION

- A. Separation of construction areas from occupied spaces. Construction areas that are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Metal stud and gypsum board (Type X) must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
 - 1. A specific stairwell and/or elevator may be assigned for construction worker use during work hours, when approved by the Owner. 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 work day. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.
 - 4. A plan detailing how exiting required by the applicable building code will be maintained.
 - 5. A plan detailing how adequate ventilation will be maintained during construction.

1.6 FIRE PREVENTION

- A. There is no smoking on school property for fire prevention and conformance to New York State Law.
- B. Any holes in floors or walls shall be sealed with a fire resistant material.
- C. Owner shall maintain existing fire extinguishers.
- D. Fire alarm and smoke detection systems shall remain in operation at all times.

1.7 CONSTRUCTION DIRECTIVES

- A. 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 abatement measures shall be taken.
- B. Construction Fume Control: Each Contractor shall be responsible for the control of chemical fumes, gases, and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure they do not enter occupied portions of the building or air intakes.
- C. Off-Gassing Control. Each Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc., are scheduled, cured or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

1.8 ASBESTOS

- A. Asbestos/Lead Test Asbestos Letter. Indication that all school areas to be disturbed during renovation or demolition have been or will be tested for lead and asbestos.
- B. Asbestos Code Rule 56. Large and small asbestos abatement projects as defined by 8 NYCRR 155.5(k) shall not be performed while the building is occupied. Note: It is SED's interpretation that the term "building" as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with 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).
 - 1. Asbestos TEM. 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.
 - 2. Lead Abatement Projects. A project that contains materials identified to be disturbed which tests positive for lead shall include that information in the Construction Documents. The Construction Documents must address the availability of lead testing data for the building and include a statement that the OSHA regulations be followed and that cleanup and testing be done by HUD protocol.

1.9 VENTILATION

- A. The work, as scheduled in the existing building, is to be performed when the facility is unoccupied. In the event that work is required to be performed during times when the building is occupied, all existing ventilation system between areas of work and areas of occupancy shall be disconnected, separated and code complying ventilation requirements be provided the occupied area. Prior to such work commencing the contractor shall submit a plan, for review indicating procedure to be taken. Also see paragraph 1.5 above for additional requirements."

1.10 ELECTRICAL CERTIFICATION:

- A. The electrical Contractor shall obtain UL Certification or Inspection from a Certified Electrical Organization for electrical installation.

1.11 EXITING

- A. Exiting: Work will be performed when school is not in session or after school hours. All exiting will be clear and usable at all times.

- B. All exits shall be clear and usable at all times.
- C. All modifications or changes to the exiting plan shall be approved by the Architect.

1.12 CONSTRUCTION WORKERS IN OCCUPIED AREAS

- A. No worker shall be permitted in areas occupied by students. If access is required by the contractor's personnel they will be supervised by District personnel. Contractor shall provided 24 hour notice to the Owner when such access will be required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Mock-ups.
- I. Tolerances.
- J. Manufacturers' field services.
- K. Defect Assessment.

1.3 RELATED REQUIREMENTS

- A. "Artical 12 General Engineering Agreement" for additional requirements.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 6000 - Product Requirements: Requirements for material, product quality and substitution procedures.

1.4 REFERENCE STANDARDS

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2015a, with Editorial Revision (2016).
- C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2018.
- E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- F. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2017.

1.5 DEFINITIONS:

- A. Refer to "Article 7 and Article 47 of the General Engineering Agreement".

1.6 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary hoist(s) and rigging.

1.7 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
- C. Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. Concrete Mix Design: As described in Section 03 3000 - Cast-in-Place Concrete. No specific designer qualifications are required.
 - 2. Structural Design of Metal Fabrications: As described in Section 05 5000 - Metal Fabrications.
 - 3. Structural Design of Railings: As described in Section 05 5213 - Pipe and Tube Railings.
 - 4. Structural Design of Foundation: As described in Section 10 7500 - Flagpoles.

1.8 SUBMITTALS

- A. Design Data: Submit for YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. Provide YPS Office of Facilities Management and Fuller and D'Angelo, P.C., interpretation of results.
 - 2. Test report submittals are for YPS Office of Facilities Management's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and installation/application subcontractor to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, for the YPS Office of

Facilities Management's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

- E. Manufacturer's Field Reports: Submit reports for YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s benefit as contract administrator or for Yonkers Public Schools.
 - 1. Submit report in duplicate within 30 days of observation to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for information.

1.9 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State of New York.
- C. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

1.10 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Fuller and D'Angelo, P.C. before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of YPS Office of Facilities Management and Fuller and D'Angelo, P.C. shall be altered from Contract Documents by mention or inference otherwise in any reference document.
- G. Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries or the internet.

1.11 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Yonkers Public Schools will employ and pay for services of an independent testing agency to perform specified testing which is the responsibility of the YPS Office of Facilities Management.
- B. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency:

1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1077, and ASTM C1093.
2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
3. Laboratory: Authorized to operate in the State in which the Project is located.
4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Fuller and D'Angelo, P.C. before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

- A. Accepted mock-ups establish the standard of quality the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for the work and they will be the sole judge the Work.
- B. Integrated Exterior Mock-ups: construct integrated exterior mock-up as directed. Coordinate installation of exterior envelope materials and products as required in individuals Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- C. Room Mock-ups: Construct room mock-ups as indicated on drawings or individual sections. Coordinate installation of materials, products, and assemblies as required in specification sections; finish according to requirements. Provide required lighting and any supplemental lighting where required to enable Fuller and D'Angelo, P.C. to evaluate quality of the mock-up.
- D. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. seven (7) working days in advance of dates and times when mock-ups will be constructed.
- E. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- F. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- G. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- H. Obtain YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s approval of mock-ups before starting work, fabrication, or construction.
- I. Fuller and D'Angelo, P.C. will use accepted mock-ups as a comparison standard for the remaining Work.
- J. Where mock-up has been accepted by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. and is specified in product specification sections to be removed, protect mock-up throughout

construction, remove mock-up and clear area when directed to do so by YPS Office of Facilities Management.

3.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Fuller and D'Angelo, P.C. before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with YPS Office of Facilities Management and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. of observed irregularities or non-conformance of Work or products.
 - 6. Perform additional tests and inspections required by YPS Office of Facilities Management
 - 7. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of the Contractor.
 - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with YPS Office of Facilities Management's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Fuller and D'Angelo, P.C..
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

- F. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by YPS Office of Facilities Management. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.5 OWNER'S TESTING AND INSPECTIONS

- A. YPS Office of Facilities Management will engage a qualified testing agency or special inspector to conduct tests and inspections as the responsibility of and paid for by Owner as follows:
1. Asbestos inspection and air monitoring
 2. Soil bearing capacity and bottom of footings.
 3. Compaction and backfilling.
 4. Mortar sampling and testing.
 5. Placement of joint reinforcement.
 6. Placement of anchors.
 7. Placement of concealed flashing.
 8. Welder's certificates.
 9. Steel studs.
 10. Gypsumboard
 11. Aluminum windows connections and fasteners.
 12. Commissioning.
- B. Contractor shall perform the work in an efficient manner consistent with industry standards. Excessive testing resulting from the contractor's inability to perform efficiently will result in back charges to the contractor.
- C. All re-inspections required for work not properly installed shall be paid for by the contractor.
- D. The Owner will not be liable for any costs or delay claims due to the testing agency or special inspector failure to provide inspection without proper and sufficient notification.
- E. All requests by the contractor for inspection that are cancelled and result in charges to the Owner will be back charged to the contractor.

3.6 CONTRACTOR'S TESTING AND INSPECTION

- A. Testing and Inspections shall be conducted by a qualified testing agency or special inspector, approved by the YPS Office of Facilities Management and as indicated in individual Specification Sections.
- B. Contractor's responsibility including:
1. Notifying YPS Office of Facilities Management, Fuller and D'Angelo, P.C, and Contractor promptly of irregularities and deficiencies observed in the work during performance of its services.
 2. Submitting a certified written report of each test, inspection, and similar quality-control service to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. with copy to Contractor and to authorities having jurisdiction.
 3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Retesting and re-inspecting corrected work.
 6. All design mixes.
 7. Testing and balancing of all plumbing and mechanical .
 8. Testing Fire Alarm, smoke detection systems, and emergency light.
 9. Testing public address system.
 10. Electrical systems.

11. Electrical Certification: The contractor shall obtain UL Certification or Inspection from a Certified Electrical Organization for electrical installations.

3.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start up of equipment, balancing of equipment, adjusting, and traffic coatings as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.8 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of YPS Office of Facilities Management, it is not practical to remove and replace the work, YPS Office of Facilities Management will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SUMMARY OF REFERENCE STANDARDS

- A. The YPS Office of Facilities Management shall file and obtain the Building Permit.
- B. Each Contractor shall furnish and pay for all other permits, fees and other installation costs required for the various installations by governing authorities and utility companies; prepare and file drawings and diagrams required; arrange for inspections of any and all parts of the work required by the authorities and furnish all certificates necessary to the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. as evidence that the work installed under this Section of the Specifications conforms with all applicable requirements of the State Codes and Municipal Code.
- C. Regulatory requirements applicable to this project are the following:
 - 1. 28 CFR 35 - Nondiscrimination on the Basis of Disability in State and Local Government Services; Final Rule; Department of Justice; current edition.
 - 2. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
 - 3. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
 - 4. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
 - 5. NFPA 1 - Fire Code; 2018.
 - 6. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - 7. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - 8. New York State Uniform Fire and Building Codes known as the "Building Codes of the State of New York" and consist of the following:
 - a. Building Code of New York State
 - b. State Education Department Planning Standards, including Commissioner's Regulation Part 155.5, 155.7
 - c. Energy Conservation Construction Code of New York State
 - d. Fire Code of New York State
 - e. Fuel Gas Code of New York State
 - f. Mechanical Code of New York State
 - g. Plumbing Code of New York State
 - h. Utility Company Regulations and Requirements.
 - i. Classification of Construction: Type I.
 - j. Occupancy Classification: Education E
 - k. State Education Department: Planning Standards is applicable to the work. Any conflicts between the Building Codes of New York and the State Education Department Planning Standards, the most restrictive shall apply. Copies of the Planning standards are available at the SED web site. www.p12.nysed.gov > facplan > documents > mps

- D. Electrical Certification: The Electrical Contractor shall obtain UL Certification or Inspection from a Certified Electrical Organization for certification of electrical installations.
- E. Any items of work specified herein and shown on the drawings which conflict with aforementioned rules, regulations and requirements, shall be referred to the Fuller and D'Angelo, P.C. for decision, which decision shall be final and binding.
- F. The work shall not be deemed to have reached a state of Substantial Completion until the certificates have been delivered
- G. EPA - Environmental Protection Agency.
- H. OSHA Part 1926 Safety and Health Regulations for Construction.
- I. Federal Regulation for Asbestos Abatement
 - 1. Title 30 CFR Part 61, Subpart G; The Transport and Disposal of Asbestos Waste
 - 2. The Transport and Disposal of Asbestos Waste]
 - 3. Title 40 CFR, Part 763 Asbestos Containing Materials in Schools; Final Rule and Notice
 - 4. Title 49 CFR Parts 106, 107, and 171-179. The Transportation Safety Act of 1974 and the Hazardous Material Transportation Act..
 - 5. Public Law 101-637 ASHARA
- J. New York State Official Compilation of Codes, Rules and Regulations
 - 1. Title 12 Part 56
 - 2. Title 10 Part 73
 - 3. Title 6 Parts 360-364
 - 4. Labor Law - Article 30 and Sections 900-912
 - 5. All applicable Additions, Addenda, Variances and Regulatory Interpretation Memoranda

1.3 MANDATORY OSHA CONSTRUCTION SAFETY AND HEALTH TRAINING

- A. Pursuant to NYS Labor Law §220-h - All laborers, workers and mechanics working on the site are required to be certified as having successfully completed an OSHA construction safety and health course of at least 10 hours prior to performing any work on the project.

1.4 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements.
- B. Section 01 4219 - Reference Standards

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Dewatering
- B. Temporary utilities.
- C. Temporary water.
- D. Storm sewer.
- E. Sanitary sewer.
- F. Temporary electric power and light.
- G. Ventilation.
- H. Temporary telephone service.
- I. Temporary sanitary facilities.
- J. Temporary Controls: Barriers, enclosures, and fencing.
- K. Dewatering facilities and drains.
- L. Hoists and temporary elevator use
- M. Waste removal facilities and services.
- N. Construction aids and miscellaneous services and facilities.
- O. Enclosure fence for the construction site.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements for submittals.
- B. Section 01 3553 - Site Safety and Security Procedures.
- C. Section 01 5213 - Field Offices and Sheds.
- D. Section 01 5510 - Traffic and Pedestrian Access & Control.
- E. Section 01 5510 - Traffic and Pedestrian Access & Control.
- F. Section 01 7000 - Execution progress cleaning.
- G. Divisions 2 through 40 ventilation and humidity requirements for products in those Sections.

1.4 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.

1.5 DEWATERING

- A. Provide temporary means and methods for dewatering all temporary facilities and controls.
- B. Maintain temporary facilities as directed by YPS Office of Facilities Management.

1.6 REFERENCES

- A. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

1.7 SITE PLAN:

- A. Show exiting fencing, temporary facilities, staging areas, and parking areas for construction personnel.

1.8 REPORTS AND PERMITS:

- A. During the progress of the Work, each prime contractor shall submit copies of reports and permits required by governing authorities, or necessary for the installation and efficient operation of temporary services and facilities
- B. Submit copies of reports of tests, inspections, and similar procedures performed on temporary utilities before, during and after performance of work. Submit copies of permits, easements and similar documentation necessary for installation, use and operation of temporary utility services.

1.9 QUALITY ASSURANCE

- A. Regulations: Each contractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Police, fire department and rescue squad rules.
 - 4. Environmental protection regulations
- B. Standards: Each prime contractor shall comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1.10 PROJECT CONDITIONS

- A. General: Each contractor shall provide each temporary service and facility ready for use at each location, when first needed to avoid delays in performance of work. Maintain, expand as required, and modify as needed throughout the progress of the work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.
- B. Temporary Use of Permanent Facilities: Regardless of previously assigned responsibilities for temporary services and facilities, the Installer of each permanent service or facility shall assume responsibility for its operation, maintenance and protection during use as a construction service or facility prior to the YPS Office of Facilities Management's acceptance and operation of the facility.
- C. Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload, and do not permit temporary services and facilities to interfere with the progress of work, or occupancy of existing facility by owner. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.
- D. Temporary Construction and Support Facilities: Maintain temporary facilities in a manner to prevent discomfort to users. Take necessary fire prevention measures. Maintain temporary facilities in a sanitary manner so as to avoid health problems.
- E. Security and Protection: Maintain site security and protection facilities in a safe, lawful, publicly acceptable manner. Take measures necessary to prevent site erosion.

1.11 TEMPORARY UTILITIES

- A. YPS Office of Facilities Management will provide the following:
 - 1. Electrical power, consisting of Contractor's connection to existing facilities.
 - 2. Water supply, consisting of Contractor's connection to existing facilities.
- B. Use trigger-operated nozzles, with back flow devices, for water hoses, to avoid waste of water.

1.12 DIVISION OF RESPONSIBILITIES

- A. Each Contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, as well as the costs and use charges associated with each facility.
 2. Plug-in electric power cords and extension cords.
 3. Supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 4. Special power requirements for installation of its own work such as welding.
 5. Its own field office complete with necessary furniture, utilities, and telephone service, if required.
 6. Its own storage and fabrication sheds if required.
 7. Temporary telephone service.
 8. All hoisting and scaffolding for its own work.
 9. Collection and disposal of all major equipment removed such as fans, toilet fixtures, and light fixtures.
 10. Secure lockup of its own tools, materials and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Containerized bottled-water drinking-water units.
 13. First Aid Station and Supplies.
 14. Disposal of wastes containers.
 15. Barricades, warning signs, and lights.
 16. Security enclosure and lockup.
 17. Temporary Fire Protection
 18. Temporary Protection for existing flooring, from altered areas to exits.
 19. Construction aids and miscellaneous services and facilities.
- B. Temporary Lighting: Electrical Contractor shall provide and pay all costs to provide local switching of temporary lighting, spaced to allow lighting to be turned off in patterns to conserve energy, retain light suitable for work-in-progress, access traffic, security check and project lock-up except for Site Contractor (who shall be responsible for their own) exterior lighting if required.
1. Provide not less than one 200-watt lamp per 400 sq. ft. of floor area, uniformly distributed, for general construction lighting, or illumination of a similar nature.
 - a. In any interior spaces where existing lighting has been removed.
- C. Temporary light and power shall be provided 15 minutes before the normal scheduled daily start of any trade and 15 minutes after the normal schedule daily completion of the last trade.

1.13 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to the Owner or the Architect, Engineer or the Owner's Representative. The YPS Office of Facilities Management will not accept a contractor's cost or use charges for temporary services or facilities as a basis of claim for an adjustment in the Contract Sum or the Contract Time.
1. Water Service Use Charges: Water from the Owner's existing water system may be used without metering, and without payment for use charges.
 2. Electric Power Service Use Charges: Electric power from the Owner's existing system may be used without payment of use charges. Contractor and Sub-Contractors shall exercise measures to conserve energy usage.
 - a. Use of owner electric for items not specific to project (e.g. heating construction shanties, etc.) will not be permitted.

1.14 TELECOMMUNICATIONS SERVICES

- A. Each Contractor shall provide and pay for its own telephone service.
 - 1. Provide mobile phone service for all field superintendents and foreman.
- B. Contract No.1 General Construction Site (exterior) and Contract No.2 General Construction Interior (interior) at central location, post a list of important telephone numbers, including the following:
 - 1. Local police and fire department.
 - 2. Ambulance service.
 - 3. Contractor's temporary and home office.
 - 4. YPS Office of Facilities Management temporary and home office
 - 5. Architect's home office.
 - 6. Principal subcontractors temporary and home office

1.15 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily in clean and sanitary condition.
- D. Sanitary Facilities: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations which will best serve the project's needs.
 - 1. Responsibilities: Contract No. 1 General Construction Site is responsible for temporary sanitary facilities and their maintenance, including supplies, for all contractors .
 - 2. Install self-contained toilets to the extent permitted by governing regulations.
 - 3. Supply and maintain toilet tissue, paper towels, paper cups and other disposable materials as appropriate for each facility for full contract duration. Provide covered waste containers for used material.
 - 4. Provide separate toilet facilities for male and female construction personnel where required by law.

1.16 BARRIERS

- A. Responsibility: General construction barriers required for the project shall be the responsibility of Contract No.1 General Construction - Site (exterior barriers) and Contract No. 2 - General Construction Interior (interior barriers).
 - 1. Construction barriers required exclusively for each prime contractor are the responsibility of that contractor
- B. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and removals .
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.17 FENCING

- A. Enclosure Fence: General: Prior to start of excavation or other substantial elements of work begin, install a general enclosure fence with suitable lockable entrance gates. Locate where indicated, or if not indicated, enclose the entire site or the portion of the site determined to be sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except through entrance gates.
 - 1. Contract No.1 General Construction - Site shall provide, maintain and pay all costs for temporary fencing until directed to remove fence from the site.
- B. Construction: Commercial grade chain link fence.

- C. Provide 8 foot (2.4 m) high fence around any materials or equipment stored on-site.; equip with vehicular and pedestrian gates with locks.
- D. Locate where indicated, or if not indicated, as agreed with YPS Office of Facilities Management. Provide enclosed portions of the site determined to be sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except through entrance gates.
 - 1. Material:
 - a. Steel fencing: Galvanized Chain Link and galvanized gates (non-climbable size).
 - b. Fabric: No. 9 GA galvanized, steel wire mesh, furnish one-piece fabric widths for fencing up to 12' in height indicated in the Contract Documents.
 - c. Framing and Accessories: End, Corner and Pull posts: 2.375" OD steel pipe.
 - d. Line Posts: Space 10'-0" O.C. maximum. 1.90" steel pipe or 1.875" x 1.625 C-sections.
 - e. Fence Rails: Locate at top and bottom of fabric. Post brace assembly - manufacturer's standard.
 - f. Wire ties: For tying fabric to line posts use wire ties spaced 12" O.C.
 - g. Height: 6'
 - 2. Excavate hole depths approximately 3" lower than post bottom; with bottom of posts set not less than 36" below finish grade surface. The line post holes will be 16" in diameter and 3'-9" in depth filled with set in a compacted mixture of gravel and earth.

1.18 INTERIOR ENCLOSURES

- A. Provide temporary dustproof partitions as required to separate work areas from Yonkers Public Schools-occupied areas, to prevent penetration of dust and moisture into Yonkers Public Schools-occupied areas, and to prevent damage to existing materials and equipment.
- B. Temporary Dustproof Partitions: Contract No.2 General Construction -Interior shall provide dustproof partitions to separate work area from occupied sections of building. Partitions shall be full height metal stud surfaced with minimum 1/2" Type X gypsum board with 2 layers of poly sheathing, overlapped and edges caulked. Provide 3' x 7' hollow metal door and frame with a lockable device and door closer where access to corridor is required..
 - 1. Where isolated work is being performed by a prime contractor the contractor performing the work shall be responsible for protecting the occupied areas from the work areas as directed by the Architect, including providing dust protection.
 - 2. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - 3. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 - 4. Where temporary wood or plywood enclosure exceeds 100sq. Ft. (9.2 sq. m) in area, use fire-retardant-treated material for framing and main sheathing.
- C. Contractor shall remove and reinstall any devices impacted by temporary partition installation. At conclusion of project electrician will again remove and reinstall these devices onto the permanent locations
- D. Refer to Section 01 7330 - Selective Removals Multiple Contracts for additional requirements.

1.19 SITE SAFETY AND SECURITY PROCEDURES- See Section 01 3553

1.20 VEHICULAR ACCESS AND PARKING 01 5310 Traffic and Pedestrian .Access * Control

1.21 WASTE REMOVAL

- A. Contract No. 2 General Construction -Interior shall provide containers, at grade, for use by all interior contractors, sufficient for the depositing of non- hazardous/non-toxic waste materials, and shall remove such waste materials from project site as required or directed by the Owner's representative.

1. Provide specific containers for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 2. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 3. Contractors shall not utilize the Owner's bins or dumpsters.
- B. Contract No.1 General Construction Site shall provide containers for all waste generated by its construction operations and shall remove such waste materials from project site as required or directed by the Owner's representative
- C. Contract No.2 General Construction Interior Contractor shall broom clean the work area at the end of each work day.
1. If the contractor fails to clean areas at the end of each work day the YPS Office of Facilities Management shall perform the cleaning and back charge the contractor accordingly.
- D. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- E. Provide containers with lids. Remove trash from site periodically.
- F. Each prime contractor shall be responsible for daily cleaning up of spillage and debris resulting from its operations and from those of its subcontractors; and shall be responsible for complete removal and disposition of hazardous and toxic waste materials.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- G. Burying or burning of waste materials on the site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. Site: The Contract No.1 General Construction -Site Contractor shall maintain Project site free of waste materials and debris.
- I. Installed Work: Keep installed work clean. Each Contractor shall clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- J. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- K. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- L. Work Areas: The General Construction Contractor shall clean areas daily where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

1.22 HOISTS

- A. Each Contractor shall provide facilities for hoisting materials and employees. Do not permit employees to ride hoists which comply only with requirements for hoisting materials. Selection of type, size and number of facilities is the Contractor's option. Truck cranes and similar devices used for hoisting are considered tools and equipment and not temporary facilities

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.

- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

1.24 DE - WATERING FACILITIES AND DRAINS

- A. The Site Contractor is directly responsible for de-watering their excavations. The responsibility of de-watering of the site to facilitate the work will be the responsibility of the Contractor No.1 General Construction Site. Coordinate with YPS Office of Facilities Management .
 - 1. Comply with requirements in applicable Division 2 Sections for temporary drainage and de-watering facilities and operations not directly associated with construction activities included in individual sections. Where feasible, use same facilities. Maintain project site, excavations, and construction free of water.
 - 2. Dispose of rainwater in a lawful manner that will not result in flooding project or adjoining property nor endanger permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 - 3. Remove snow and ice as required to minimize accumulations

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION -

3.1 STORAGE FACILITIES

- A. Each Contractor and each subcontractor shall provide temporary storage facilities as required for his own use. Temporary structures shall be located at the fenced staging area, and shall be removed upon completion of the work or when directed.
 - 1. All temporary storage facilities and location shall be subject to the approval of YPS Office of Facilities Management.
- B. Materials delivered to the site shall be safely stored and adequately protected against loss or damage. Particular care shall be taken to protect and cover materials that are liable to be damaged by the elements.
- C. Due to limited on site storage space, each Contractor shall coordinate delivery of his materials with the YPS Office of Facilities Management who will determine when large deliveries shall be made and shall be designate storage locations on site for delivered materials. All stored materials must be stored in locked, watertight trailers, paid for by applicable contractor.

3.2 SCAFFOLDING AND STAGING

- A. All scaffold, staging and appurtenances thereto shall comply in total to the requirements of Safety and Health Regulations for Construction Chapter XVII of OSHA, Part 1926 and all related amendments.

3.3 ROOF PROTECTION

- A. Each Contractor(s) shall provide temporary protection on any existing roof surface when it is necessary for work to take place on completed sections.
- B. Upon such notification as required in subparagraph A, the Contractor shall assume responsibility for damages, if any, to the roofing system caused by the work of other trades, except that financial liability for any and all damages rests with the offending trade.

3.4 FIRE PREVENTION AND CONTROL Refer to Section 01 3553 - Site Safety and Security Procedures.

3.5 DISCONTINUE, CHANGES AND REMOVAL

- A. Each Contractor(s) shall:
 - 1. Discontinue all temporary services required by the Contract when so directed by the YPS Office of Facilities Management .
 - 2. The discontinuance of any such temporary service prior to the completion of the work shall not render the Owner liable for any additional cost entailed thereby and the Contractor shall thereafter

furnish, at no additional cost to the Owner, any and all temporary service required by such Contractors work.

3. Remove and relocate such temporary facilities as directed by the YPS Office of Facilities Management without additional cost to the Owner, and shall restore the site and the work to a condition satisfactory to the Owner.

3.6 TRAFFIC CONTROLS

- A. Contract No.1 General Contractor Site shall provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads, barricades, flagmen, etc. Comply with requirements of authorities having jurisdiction.

3.7 ENVIRONMENTAL PROTECTION:

- A. The Contract No.1 General Contractor Site shall provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near Project site.

3.8 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 1. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

END OF SECTION

SECTION 01 5510
TRAFFIC AND PEDESTRIAN ACCESS & CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. General Construction Contractor shall maintain traffic for the duration of the contract and protect the traveling public and pedestrians from all damage to persons and property within the limits of and for the duration of the contract; all in accordance with the plans and specifications.
- B. It is specifically noted that while school is in session, there are children playing at recess, walking to outdoor gym classes, etc. Contractor's trucks must be walked from the project site to the main traffic loop and vice versa, with a separate monitoring individual to insure children's safety. See 01 1000 - Summary for delivery black out times.

1.3 METHOD OF MAINTAINING AND PROTECTING TRAFFIC

- A. Contractor shall maintain and protect traffic by so conducting his construction operations that the traveling public and pedestrian safety is subjected to a minimum of hazard and delay. In order to adequately maintain and protect traffic, contractor shall perform the following additional minimum requirements as directed by YPS Office of Facilities Management:
 - 1. Keep the surface of the traveled way free from mounds, depressions, and obstructions of any type which could present hazards or annoyance to traffic.
 - 2. Keep the surface of all pavements used by the public free and clean of all dirt, debris, stone, timber or other obstructions to provide safe traveled ways.
 - 3. Control dust and keep the traveled way free from materials spilled from hauling and construction equipment.
 - 4. Provide all cones, barricades, signs and warning devices as may be required and/or as ordered by the YPS Office of Facilities Management to safely carry out the foregoing. All such signs and devices shall be fabricated and placed in accordance with the latest "Federal Manual on Uniform Control Devices". Use of Open Flares Is Prohibited.
 - 5. Prepare and submit for approval sketch/drawing showing proposed location and type of signs, barricades and devices as required in above.
 - 6. General Construction Contractor shall cover with steel plates all open trenches at the close of each work day. Such plates to abut each other and be wedged at each end of trench to prevent plates from sliding open.
 - 7. Contractor to post temporary construction signs, including construction traffic signs, safety signs, security signs, and no trespassing signs as required.

1.4 INGRESS AND EGRESS

- A. General Construction Contractor shall provide and maintain at all times safe and adequate ingress and egress to and from site at existing or at new access points consistent with work, unless otherwise authorized by the YPS Office of Facilities Management.

1.5 CONTRACTOR'S ATTENTION IS DIRECTED TO

- A. If, upon notification by YPS Office of Facilities Management, contractor fails to correct any unsatisfactory condition within 24 hours of being so directed, Owner's Representative will immediately

proceed with adequate forces to properly maintain the project and the entire cost of such maintenance shall be deducted (back charged) from any moneys due the contractor.

1.6 PAYMENT

- A. The lump sum bid price for this item shall include the cost of furnishing all labor, material and equipment including the cost of any and all incidental required by job conditions as ordered by YPS Office of Facilities Management and included in their proposal.
- B. Withholding of Payment
 - 1. No payment will be made under Maintenance and Protection of Traffic for each calendar day during which there are substantial deficiencies in compliance with the specification requirements of any subsection of this section, as determined by the YPS Office of Facilities Management.
 - 2. If Contractor fails to maintain and protect traffic adequately and safely for a period of 24 hours, the YPS Office of Facilities Management shall correct the adverse conditions by any means he deems appropriate, and shall deduct the cost of the corrective work from any Monies due the Contractor. The cost of this work shall be in addition to the liquidated damages and nonpayment for Maintenance and Protection of Traffic listed above.
 - 3. However, where major nonconformance with the requirements of this specification is noted by the Owner's Representative and prompt contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Owner's Representative regardless of whether corrections are made by the Owner's Representative as stated in the paragraph above.
 - 4. However, where major nonconformance with the requirements of this specification is noted by the YPS Office of Facilities Management and prompt contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the YPS Office of Facilities Management regardless of whether corrections are made by the YPS Office of Facilities Management as stated in the paragraph above.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations and procedures.
- F. Maintenance materials, extra materials.

1.3 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary of Contract.
- B. Section 01 2500 - Substitution Procedures: Substitutions made after the Bidding/Negotiation Phase.
- C. Section 01 3000 - Administrative Requirements.
- D. Section 01 4000 - Quality Requirements: Product quality monitoring.
- E. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- F. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.4 REFERENCE STANDARDS

- A. ISO 21930 - Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services; 2017.
- B. NEMA MG 1 - Motors and Generators; 2017.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.5 DEFINITIONS

- A. Refer to "Article 7 General Engineering Agreement" for additional requirements
- B. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- C. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
- D. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

- E. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- F. Substitutions: Changes in products, materials, equipment, and methods of construction from those required or specified by the Contract Documents and proposed by Contractor.
- G. Basis-of-Design Or Equal Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," or "or equal", including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers **shall be submitted as substitutions**.
- H. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

1.6 SUBMITTALS

- A. Refer to Section 01 3000 - Administrative Requirements for additional requirements
- B. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 10 days after date of Notice of Award.
 - 2. For products specified only by reference standards, list applicable reference standards.
- C. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.7 ASBESTOS

- A. Asbestos: All products, materials, etc., used in conjunction with this Project shall be Asbestos-Free.
 - 1. Contractor shall provide a certified letter to the YPS Office of Facilities Management stating that no asbestos containing material has been used in this project. Refer to Section 01 7800 - Closeout Submittals.
- B. Contractor(s) and sub contractors must provide test results upon completion from a New York State accredited testing lab certifying that all material including joint and pipe insulation on this project is non-asbestos.
 - 1. This certification shall be based on a sampling of 10% of all linear feet of pipe insulation, (unless manufacturer's certificate is submitted).

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Yonkers Public Schools, or otherwise indicated as to remain the property of the Yonkers Public Schools, become the property of the Contractor(s); remove from site.

2.2 NEW PRODUCTS

- A. Provide new products for all unless otherwise specifically required or permitted by the Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Made outside the United States, its territories, Canada, or Mexico.
 - 2. Made using or containing CFC's or HCFC's.
 - 3. Made of wood from newly cut old growth timber.
 - 4. Containing lead, cadmium, or asbestos.

2.3 PRODUCT OPTIONS

- A. Refer to Section 00 2113 - Instructions to Bidders for Product/Assembly/System Substitutions.
- B. Refer to Section 01 2500 - Substitution Procedures.
- C. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 3000 - Administrative Requirements. All products, **other than "Basis of Design"**, shall be submitted as a substitution. Show compliance with requirements. Submit on form attached.

2.4 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
 - 1. Deliver to YPS Office of Facilities Management; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.
- B. Substitutions will not be considered during the bidding phase.

3.2 SUBSTITUTION SUBMITTAL PROCEDURE AFTER BIDDING PHASE

- A. Refer to Section 01 2500 - Substitution Procedures.

3.3 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide off-site storage and protection when site does not permit on-site storage or protection.
 - 1. Execute a formal supplemental agreement between Yonkers Public Schools and Contractor allowing off-site storage, for each occurrence.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Do not store products directly on the ground.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.
- C. VOC restrictions for product categories listed below under "DEFINITIONS."
- D. All products of each category that are installed in the project must comply; Yonkers Public Schools's project goals do not allow for partial compliance.

1.3 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements and product options, delivery, storage, and handling.
- D. Section 07 9200 - Joint Sealants: Emissions-compliant sealants.
- E. Section 09 5100 - Acoustical Ceilings.
- F. Section 09 9123 - Interior Painting.
- G. Section 09 9113 - Exterior Painting.
- H. Section 09 6500 - Resilient Flooring.

1.4 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Products making up wall and ceiling assemblies.
 - 5. Thermal and acoustical insulation.
 - 6. Free-standing furniture.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Exterior and interior paints and coatings applied on site.
 - 2. Exterior and interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Wet-applied roofing and waterproofing.
- C. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:
 - 1. Interior of Building: Anywhere inside the exterior weather barrier.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

2. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
3. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- D. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 1. Concrete.
 2. Clay brick.
 3. Metals that are plated, anodized, or powder-coated.
 4. Glass.
 5. Ceramics.
 6. Solid wood flooring that is unfinished and untreated.

1.5 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
- C. BIFMA e3 - Furniture Sustainability Standard; Business and Institutional Furniture Manufacturers Association; 2014.
- D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- E. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.
- F. GreenSeal GS-36 - Adhesives for Commercial Use; 2013.
- G. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
- H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- I. SCS (CPD) - SCS Certified Products; Current Edition.
- J. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Evidence of Compliance: Submit for each different product in each applicable category.
- C. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.7 QUALITY ASSURANCE

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
 1. Wet-Applied Products: State amount applied in mass per surface area.
 2. Paints and Coatings: Test tinted products, not just tinting bases.
 3. Evidence of Compliance: Acceptable types of evidence are the following;
 - a. Current UL (GGG) certification.
 - b. Current listing in CHPS (HPPD) as a low-emitting product.
 - c. Current CRI (GLP) certification.
 - d. Test report showing compliance and stating exposure scenario used.
 4. Product data submittal showing VOC content is NOT acceptable evidence.
 5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Aerosol Adhesives: GreenSeal GS-36.
 - 3. Joint Sealants: SCAQMD 1168 Rule.
 - 4. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).
 - 5. Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.
- C. All VOC-Restricted Products: Provide products having VOC content of types and volume not greater than those specified in State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Current GREENGUARD Children & Schools certification; www.greenguard.org.
 - b. Current SCS Indoor Advantage Gold certification; www.scs-certified.com.
 - c. Product listing in the CHPS Low-Emitting Materials Product List at www.chps.net/manual/lem_table.htm.
 - d. Current certification by any other agencies acceptable to CHPS.
 - e. Report of laboratory testing performed in accordance with CHPS requirements for getting a product listed in the Low-Emitting Materials Product List; report must include laboratory's statement that the product meets the specified criteria.
 - 2. Product data submittals showing VOC content are NOT acceptable forms of evidence.
- D. Adhesives and Joint Sealants: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- E. Aerosol Adhesives: Provide only products having volatile organic compound (VOC) content not greater than required by GreenSeal GS-36.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Current GreenSeal Certification.
- F. Paints and Coatings: Provide products having VOC content as specified in Section 09 9113 - Exterior Painting and 09 9123 - Interior Painting.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Yonkers Public Schools reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Yonkers Public Schools.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 7000
EXECUTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Inspections prior to start of work.
- B. Examination, preparation, and general installation procedures.
- C. Requirements for alterations work, including selective removals .
- D. Pre-installation meetings.
- E. Surveying for laying out the work.
- F. Site scoping.
- G. Construction layout.
- H. General installation of products.
- I. Progress cleaning.
- J. Protection of installed construction.
- K. Correction of the Work.
- L. Dust control
- M. Cleaning and protection.
- N. Starting of systems and equipment.

1.3 RELATED REQUIREMENTS

- A. YPS General Engineering Agreement for additional requirements.
- B. Section 01 1000 - Summary of Contract: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials
- C. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- D. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- E. Section 01 5000 - Temporary Facilities and Controls.
- F. Section 01 3553 - Site Safety and Security Procedures .
- G. Section 01 5713 - Temporary Erosion and Sediment Control.
- H. Section 01 7310 - Cutting and Patching.
- I. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
- J. Section 01 7800 - Closeout Submittals: Project substantial completion, record documents, operation and maintenance data, warranties .
- K. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

- L. Section 07 8400 - Firestopping.
- M. Section 07 9200 - Joint Sealants.
- N. Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.

1.4 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. Submit documentation verifying accuracy of existing survey.
 - 2. Submit surveys and survey logs for the project record.
- C. Certified Surveys: Submit two copies signed by land surveyor or professional engineer for each the following surveys:
 - 1. Final Survey: Before substantial completion, the Surveyor shall prepare a final property survey showing significant features (real property) that have resulted from construction of the project, including underground utilities, tanks and similar work install under all contracts.
 - a. Each prime contractor shall provide related information to the surveyor for the work installed under their contract. Include on the survey a certification, signed by the Surveyor, to the effect that the principal lines and levels of the project are accurately positioned as shown on the drawings.
 - b. Show, where applicable, boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - c. Final Survey: Submit one (1) CAD drawing showing the Work performed and record survey data.
- D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E. Cutting and Patching: Refer to Section 01 7310 - Cutting and Patching for requirements.

1.6 QUALIFICATIONS

- A. Refer to individual sections for additional requirements.
- B. Each Contractor shall do all cutting, patching, repairing as necessary for their work. In all cases, the cutting, patching, repairing and finishing shall be performed by mechanics skilled in the particular trade required at no additional cost to the Owner.
- C. For survey work, the Construction Contractor shall employ a land surveyor registered in New York and acceptable to YPS Office of Facilities Management. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- D. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in State of New York.

1.7 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

- D. Perform dewatering activities, as required, for the duration of the project.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Each Contractor shall execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. The General Construction Contractor shall provide dust-proof barriers between construction areas and non construction areas inside or outside the construction areas.
- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Refer to Section 01 5713 - Temporary Erosion and Sediment Control for additional requirements.
- H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations when the building is occupied..
 - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day when building is occupied; excessively noisy includes jackhammers and pneumatic hammers.
 - 2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
 - 3. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.

1.8 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Contract Manual and Specification to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of work of separate sections.
- F. After Yonkers Public Schools occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Yonkers Public Schools's activities.
- G. General: The General Construction Contractor includes general coordination of the entire work of the project, including preparation of general coordination drawings, diagrams and schedules and control of site utilization from the beginning of construction activity through project closeout and warranty periods.
- H. Alterations: Where applicable, requirements of the contract documents apply to alteration work in the same manner as to new construction. Refer to drawings for specific requirements of alteration work. Primarily, alterations can be described as normal architectural, mechanical and electrical alterations. Contractors shall review phasing and scheduling of the work to understand that certain areas of work must be completed and occupied prior to start of other work. This is essential to the Owner in their ability to maintain the educational programs during construction.

1.9 CODES, PERMITS, FEES

- A. Refer to Section 01 4100 - Regulatory Requirements.

1.10 MANDATORY OSHA CONSTRUCTION SAFETY AND HEALTH TRAINING

- A. Pursuant to NYS Labor Law §220-h - On all public work projects all laborers, workers and mechanics working on the site are required to be certified as having successfully completed an OSHA construction safety and health course of at least 10 hours prior to performing any work on the project.

PART 2 PRODUCTS

2.1 MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.
- D. Barriers shall be constructed of sturdy lumber having a minimum size of 2 x 4.
 - 1. Signs shall be made of sturdy plywood of 1/2" minimum thickness and shall be made to legible at a distance of 50 feet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to start of construction take photographs, video's or similar documentation as evidence of existing project conditions as follows:
 - 1. Interior views: Each room and areas of outside work area which could be construed as damaged caused by the contractor.
 - 2. Exterior views: Each area of work and areas of outside work area which could be construed as damage caused by the contractor.
- B. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site **prior to commencing work of the section.**
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify YPS Office of Facilities Management and Fuller and D'Angelo, P.C. four days in advance of meeting date.

- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to YPS Office of Facilities Management and Fuller and D'Angelo, P.C., participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify YPS Office of Facilities Management of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to YPS Office of Facilities Management the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to YPS Office of Facilities Management
- F. Utilize recognized engineering survey practices.
- G. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
- I. Periodically verify layouts by same means.
- J. Maintain a complete and accurate log of control and survey work as it progresses.

3.5 REMOVAL AND DUST CONTROL

- A. The following procedures shall be followed when removals will create dust:
 - 1. Exterior
 - a. Work must be in compliance with OSHA Construction Standard (29 CFR 1926.62).
 - b. Windows directly below, above and adjacent to the work area shall be closed.
 - c. Provide tarps on the outside of the building to catch all dust, debris and paint chips when items are being removed and/or installed.
 - d. Roof top exhaust fans and HVAC equipment to shut down and intakes covered.
 - 2. Interior:
 - a. Floor surfaces shall be provided with a minimum of one layer of six mil plastic from work area to exits.
 - b. All air vents in the room shall be closed, shut off and sealed.
 - c. Access to all rooms undergoing removals shall be restricted to prevent unauthorized entry.
 - d. All moveable objects will be moved away from the vicinity of the removals by the Contractor. The Contractor shall cover with a drop cloth.
 - e. All corridors used by Contractors shall be mopped and left clean daily prior to occupancy.
 - 3. General Construction Contractor shall provide labor for daily cleanup on the interior and the exterior of the building as required or directed by the YPS Office of Facilities Management. Any visible debris shall be removed prior to occupancy the following day.

4. All debris shall be disposed of properly in accordance with Federal, State and Local Regulations. Refer to Section 01 5000 - Temporary Facilities and Controls and asbestos and lead abatement sections for containers required.
5. Do not leave any openings unprotected at end of work day or during periods of excessive cold weather or precipitation.
6. At completion of each work area HEPA vacuumed and wet wipe.

3.6 CHEMICAL FUMES AND OTHER CONTAMINATES

- A. Each Contractor shall be responsible for the control of chemical fumes, gases and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes.
- B. Each Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc., are scheduled, cured or ventilated in accordance with manufacturer's recommendations before a space can be occupied.

3.7 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Saw cut all concrete slabs and asphalt paving.
- E. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- F. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- G. Make neat transitions between different surfaces, maintaining texture and appearance.

3.8 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 1. Verify that construction and utility arrangements are as indicated.
 2. Report discrepancies to YPS Office of Facilities Management before disturbing existing installation.
 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are occupied or unoccupied.
 1. Provide, erect, and maintain temporary dustproof partitions of construction as indicated in Section 01 7000 .
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 1. Remove items indicated on drawings.

2. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 3. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Identify new equipment installed, but not in service, with appropriate signage or other forms of identification. indicating "Not in Service".
 - b. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - c. Provide temporary connections as required to maintain existing systems in service.
 - d. Perform all switchovers, shutdowns, etc after hours, weekends, holidays or times when the building is not occupied. All switchover scheduling shall be approved by the Owner.
 4. Verify that abandoned services serve only abandoned facilities.
 5. Remove conduits; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 2. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Fuller and D'Angelo, P.C. review and request instructions.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
- J. Remove debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before removals are complete.
- L. Comply with all other applicable requirements of this section.

3.9 CUTTING AND PATCHING Refer to Section 01 7310 - Cutting and Patching

3.10 SPECIAL REQUIREMENTS

- A. All existing systems are required and shall remain operational during the performance of the work.
- B. Notwithstanding anything contained in the Contract Documents to the contrary, the contractor shall not be permitted to disrupt operation of any building system or any of the services without YPS Office of

Facilities Management's prior written consent, which shall not be unreasonably withheld. Any request to perform such work shall be in writing, received by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. no less than 5 working days prior to the commencement of the request for disruption, and shall detail:

1. The exact nature and duration of such interruption;
2. The area of the Building affected, and;
3. Any impact upon the Construction Schedule caused by such proposed temporary disruption. All Work shall be performed during the hours and on the days set forth in the Specifications.

3.11 FIRE PREVENTION AND CONTROL Refer to Section 01 3553

3.12 UNDERGROUND UTILITIES

- A. Call 1-800-962-7962 (Call Before You Dig) and register before beginning any excavation at least two (2) working days prior to the start of construction.
- B. Locate and identify existing underground and overhead services and utilities within the Contract Limits. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations.
 1. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
 2. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the YPS Office of Facilities Management immediately to obtain procedural directions. Cooperate with the applicable utility companies in maintaining active services in operation.
- C. Broken utilities from work are the responsibility of the Contractor. Use extreme caution when uncovering utilities. If a utility is broken while uncovering because the utility was not in the exact location identified, the cost of repair is the responsibility of the Contractor.

3.13 WATCHMAN

- A. The YPS Office of Facilities Management will not provide watchman. The Contractor will be held responsible for loss or injury to persons or property or work where his work is involved and shall provide such watchman and take such precautionary measures as he may deem necessary to protect his own interests.

3.14 SECURITY SYSTEM Refer to 01 3553 - Security Procedures

- A. The existing building contains a security alarm system maintained and operated by the Owner. Access into the existing building shall not be permitted unless the owner is notified and arrangements made to deactivate the system.

3.15 VERIFICATION OF CONDITIONS

- A. All openings, measurements, door frames, existing conditions and other similar items or conditions shall be field measured prior to submission of any shop drawings or manufacturers literature for approval.
 1. Each Contractor shall investigate each space into and through which equipment must be moved. Equipment shall be shipped from manufacturer in sections, of size suitable for moving through restricted spaces. Where sectional fabrication and or delivery cannot be achieved, openings, enlargements etc shall be provided by each contractor whose equipment requires access, at no additional cost to the Owner.

3.16 PROGRESS CLEANING

- A. Each Prime Contractor is responsible for their own daily debris removal into containers provided by the General Construction Contractor. Working areas are to be broom swept on a daily basis by the General Construction Contractor.
- B. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

- C. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space pipe chases, plenums, attics, crawl spaces, and and other closed or remote spaces,.
- D. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- E. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.17 PROTECTION OF INSTALLED WORK

- A. Each Contractor shall be responsible for the protection of all his work and shall make good all damage to the Owners property, adjoining property, and/or to any work or material in place in the premises, or included in his contract, which is caused by his work or workmen. which may occur to his work prior to the date of the final acceptance.
 - 1. From the commencement to the completion of the Project, each Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause.
- B. Each Contractor shall be held responsible for and be required to make good at his own expense any and all damage done to the Owners property, adjoining property, and/or to any work or material in place in the premises, or included in his contract, which is caused by his work or workmen.
 - 1. From the commencement to the completion of the Project, Each Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause of
- C. Mechanical and electrical equipment delivered and stored at the site, properly packed and crated. Each piece of equipment shall remain packed and crated at location until final installation. Uninstalled and installed equipment and materials shall be protected against damage by weather, water, paint, plaster, moisture, fumes, dust or physical damage.
- D. Protect installed work from damage by construction operations.
- E. Provide special protection where specified in individual specification sections.
- F. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- G. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- H. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- I. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- J. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.18 SYSTEM STARTUP

- A. Coordinate with requirements of Section 01 9113 - General Commissioning Requirements.
- B. Coordinate schedule for start-up of various equipment and systems.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of Contractor's personnel and manufacturer's representative in accordance with manufacturers' instructions.

- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.19 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.

3.20 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Refer to Individual Sections for Testing, adjusting, and balancing of systems: .

3.21 FINAL CLEANING

- A. Final cleaning shall be the responsibility of the General Construction Contractor and all costs for final cleaning shall be included in the Base Bid. Final cleaning responsibility shall be limited to all areas where renovations occur.
- B. Execute final cleaning prior to final project assessment.
- C. Use cleaning materials that are nonhazardous.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean debris from area drains.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- H. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- I. Remove snow and ice to provide safe access to building.
- J. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- K. Touch up and otherwise repair and restore marred, exposed finishes and surfaces evidence of repair or restoration. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show
- L. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- M. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- N. Leave Project clean and ready for occupancy.
- O. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.22 CLOSEOUT PROCEDURES Refer to Section 01 7800

3.23 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.

END OF SECTION

**SECTION 01 7310
CUTTING AND PATCHING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SUMMARY

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. This Section includes procedural requirements for cutting and patching.
 - 1. Refer to other Sections for specific requirements and limitations applicable to cutting and patching.
 - 2. Requirements of this Section apply to all contracts. Refer to various sections and divisions of these specifications for other requirements and limitations applicable to cutting and patching.
 - 3. Contractor acknowledges that the work involves renovation and alteration of existing improvements and, therefore, cutting and patching of the work is essential for the Project to be successfully completed. Contractor shall perform any cutting, altering, patching and fitting of the work necessary for the work and the existing improvements to be fully integrated and to present the visual appearance of an entire, completed, and unified project. In performing any work which requires cutting, fixing, or patching, Contractor shall use its best efforts to protect and preserve the visual appearance and aesthetics of the project to the reasonable satisfaction of both the Owner and the Architect.
 - 4. Each Contractor shall do all cutting, patching, repairing as necessary for their work. In all cases, the cutting, patching, repairing and finishing shall be performed mechanics skilled in the particular trade required at no additional cost to the Owner.

1.3 RELATED SECTIONS

- A. Division 1 Section 01 7132 - Selective Removals Single Prime for removals of selected portions of the building for alterations.
- B. Section 01 7330 - Selective Removals Multiple Contracts.
- C. Section 07 8400 - Firestopping for patching fire-rated construction.
- D. Requirements in this Section apply to all contractor(s) installations. Refer to Divisions 22, 23, and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.4 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.5 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Structural integrity of any element of Project.
 - 2. Visual qualities of sight exposed elements.
 - 3. Work of Yonkers Public Schools or separate Contractor.

4. Effect on work of Yonkers Public Schools or separate Contractor.
5. Written permission of affected separate Contractor.
6. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
7. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
8. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
9. Obtain approval of cutting and patching proposal before cutting and patching from YPS Office of Facilities Management. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.6 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 1. Primary operational systems and equipment.
 - a. Fire-protection systems.
 - b. Control systems.
 - c. Communication systems.
 - d. Conveying systems.
 - e. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 1. Water, moisture, or vapor barriers.
 - a. Membranes and flashings.
 - b. Exterior curtain-wall construction.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in YPS Office of Facilities Management's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

- B. Prior to cutting and patching verify with YPS Office of Facilities Management all existing warranties in effect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
- B. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- B. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition. A sufficient time in advance of the construction of new walls, floors, or roofing etc. Each Contractor shall be responsible for properly locating and providing in place all sleeves, inserts and forms required for work.
- C. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete/Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Section 31 2316 - Excavation where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- D. All cutting of holes in existing walls, existing floors, existing roofs, existing ceilings, etc. for the removal of any existing work (including, but not limited to ducts, fans, fixtures, motors, equipment, drains, wiring, conduit, etc.) or for the installation of any new work shall be done in a neat manner by each Contractor. Debris caused by such cutting or removals will be removed by each Contractor.
- E. Where sleeves, inserts or openings are required in existing walls, floors, roofs, vaults and pavements of existing buildings or structures, all necessary cutting, furnishing and installing of sleeves, inserts, lintels, etc., shall be done by each Contractor.
- F. Adequate blocking, fastening, etc., required to support equipment, casework, etc., from existing walls shall be included as required to complete work.
- G. All surfaces where existing items are removed from existing walls, floors, ceilings, roofs, vaults, etc. shall be patched to match existing surfaces.
 1. All patching shall be provided with prime and finish paint or other material to match existing. In areas indicated to be completely painted/finished by the Contractor for Construction, other prime contractors shall be required only to patch existing surfaces to match as required to accept new finishes.
 2. Proceed with patching after construction operations requiring cutting are complete.
- H. Removals of selected portions of the building for alterations is included in Section "Selective Removals".
- I. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Substantial Completion.
- B. Final Completion.
- C. Project record documents.
- D. Operation and maintenance data.
- E. Warranties and bonds.

1.3 RELATED REQUIREMENTS

- A. Refer to Article 81 YPS General Engineering Agreement for additional requirements.
- B. YPS General Engineering Agreement Article 81 for additional requirements.
- C. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.4 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion:
 - 1. Prepare a list of items to be completed and corrected, the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise YPS Office of Facilities Management and Fuller and D'Angelo, P.C. of pending insurance changeover requirements.
 - 3. Obtain and submit releases permitting YPS Office of Facilities Management and Fuller and D'Angelo, P.C. unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- B. Prior to issuance of the Certificate of Substantial Completion, submit, in writing, a request to the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. to perform site inspection for the purpose of preparing a "punch list".
- C. On receipt of request the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. will schedule and prepare a punch list.
- D. Certificate of Substantial Completion will be issued **only after completion of all punch list items** or YPS Office of Facilities Management and Fuller and D'Angelo, P.C. will notify Contractor of items, either punch list or additional items identified by Architect, **that must be completed or corrected before a certificate will be issued.** After completion of **all punch list items** submit the following:
 - 1. Application for Payment showing 100 percent completion for portion of the Work claimed as substantially completed.
 - 2. Manufacturer's Warranties/guarantees.
 - 3. Contractor's Warrantee Two (2) years minimum and extended warranties.

4. Maintenance agreements, if any.
 5. Manifest for disposal of Hazardous Material.
 6. Manifest for disposal of material.
 7. Test/adjust/balance reports and records.
 8. Maintenance Manuals and Instructions Manuals
 9. Signed Receipt by YPS Office of Facilities Management of spare parts and attic stock.
 10. Start-up performance reports.
 11. Changeover information related to Owner's occupancy, use, and maintenance.
 12. Advice on shifting insurance coverage.
 13. List of incomplete Work, recognized as exceptions to Architect's "punch list".
 14. Removal of temporary facilities and services.
 15. Removal of surplus materials, rubbish and similar elements.
 16. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 17. As Built Drawings.
 18. Project Record Documents.
 19. DOL Final Completion Form. (PW 200).
- E. Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
1. If necessary re-inspection will be repeated and the contractor shall pay for all additional inspections.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.5 FINAL PAYMENT

- A. Refer to School Facilities Management Contract Manual and Specifications for additional requirements.
- B. Following issuance of the Substantial Completion of work submit the following:
1. Architect's punch list certifying all punch list items have been completed with each item signed off by the YPS Office of Facilities Management and Contractor.
 2. Update final statement, accounting for final changes to the Contract Sum.
 3. Release of liens from contractor and all entitles of the contractor.
 4. Consent of Surety to Final Payment, AIA Document G707.
 5. Final Liquidated Damages settlement statement.
 6. Contractor's Affidavit of Release of Liens (AIA G706A).
 7. Contractors Affidavit of Payment of Debts and Claims (AIA G706).
 8. Contractor's Certification of Payment of Prevailing Wage Rates.
 9. Contractor's Certification of Compliance that products comply with VOC requirements stated in Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
 10. Contractor's Certified Statement that no asbestos containing material was incorporated into the project.
 11. Asbestos manifest.
 12. Underwriters Certificate or authorized third party Certificate.

1.6 SUBMITTALS

- A. Contractor shall submit all documentation identified in this section within thirty (30) working days from the time the Contractor submits the list of items to be corrected, in addition to other rights of the Owner set forth elsewhere in the Contract Documents, to include but not limited to withholding of final payment. If the documentation has not been submitted within Thirty (30) day period, the Owner will obtain such through whatever means necessary. The Contractor shall solely be responsible for all expenses incurred by

the Owner, provided the Owner has advised the Contractor of this action seven7 days prior to the culmination date by written notice

- B. Project Record Documents: Submit documents to Fuller and D'Angelo, P.C. with claim for final Application for Payment.
- C. Warranties and Bonds:
 - 1. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by YPS Office of Facilities Management.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.2 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and approved Shop Drawings at the project site.
- B. Each Prime Contractor is responsible for marking up Sections that contain its own Work and for submitting the complete set of record Specifications as specified.
- C. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
- D. Content: Types of items requiring marking include, but are not limited to, the following:
 - 1. Dimensional changes to Drawings.
 - 2. Revisions to details shown on Drawings.
 - 3. Locations and depths of underground utilities.
 - 4. Revisions to routing of piping and conduits.
 - 5. Revisions to electrical circuitry.
 - 6. Actual equipment locations.
 - 7. Duct size and routing.
 - 8. Changes made by Change Order or Construction Change Directive.

9. Changes made following YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s written orders.
10. Details not on the original Contract Drawings.
- E. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
- F. Mark important additional information that was either shown schematically or omitted from original Drawings.
- G. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- H. **Provide three copies of final record contract drawings, specifications and approved shop drawings on CD in PDF format.**

3.3 RECORD CAD DRAWINGS

- A. Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with YPS Office of Facilities Management and Fuller and D'Angelo, P.C.. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:
 1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
 2. Incorporate changes and additional information previously marked on Record Prints. Delete, re draw, and add details and notations where applicable.
 3. Refer instances of uncertainty to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. for resolution.
- B. Fuller and D'Angelo, P.C. and Consultant will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
 1. Fuller and D'Angelo, P.C. and Consultant makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
 2. CAD Software Program: The Contract Drawings are available in Auto CAD 2007.

3.4 FORMAT

- A. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Contractor shall certify and sign.
- B. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Identify Record Drawing as follows:
 1. Project name.
 - a. Date.
 - b. Designation "PROJECT RECORD DRAWINGS."
 - c. Name of Owner, YPS Office of Facilities Management, Fuller and D'Angelo, P.C., and Contractor(s)
 - d. Contractor(s) shall certify and sign each drawing.

3.5 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.6 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.7 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - 1. Include HVAC outdoor and exhaust air damper calibration strategy.
 - a. Include provisions which ensure that full closure of dampers can be achieved.
 - 2. Include Carbon Dioxide Monitoring Protocol.
 - 3. Include Carbon Monoxide Monitoring Protocol.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide contractors's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

3.8 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Yonkers Public Schools's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of YPS Office of Facilities Management, Fuller and D'Angelo, P.C., Consultant, Contractor(s), and Sub-contractor(s) , with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Operation and maintenance data.
 - c. Field quality control data.
 - d. Photocopies of warranties and bonds.
- K. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
 - 1. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3.9 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with YPS Office of Facilities Management's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor(s) and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

**CHECKLIST FOR PROJECT CLOSEOUT
AND PROCESSING OF FINAL PAYMENT**

A. **PROJECT:** Windows, Masonry & Site Improvements,.

BOARD OF EDUCATION BID NUMBER: PS 29 - YPS # 10878

CLOSE-OUT SUBMITTALS: (As Applicable)

- ☐ **PREVAILING WAGE CERTIFICATION.**
- ☐ **UL CERTIFICATION**
- ☐ **THREE (3) 3-RING BINDER BROCHURES OF OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT INSTALLED ON THE PROJECT INCLUDING THE FOLLOWING:**
 - ☐ **TYPED OR PRINTED INSTRUCTIONS COVERING THE CARE AND OPERATIONS OF EQUIPMENT AND SYSTEMS FURNISHED AND INSTALLED.**
 - ☐ **MANUFACTURERS INSTRUCTION BOOKS, DIAGRAMS, SPARE PARTS LISTS COVERING ALL EQUIPMENT.**
 - ☐ **INSTRUCTION OF OWNER'S REPRESENTATIVE IN CARE AND MAINTENANCE OF NEW EQUIPMENT.**
 - ☐ **ALL APPROVED SHOP DRAWINGS.**
 - ☐ **CERTIFICATES OF COMPLIANCE AND INSPECTION. (WHERE APPLICABLE MANUFACTURER'S REPORTS, ELECTRIC, ELEVATOR, ETC.)**
 - ☐ **SPARE PARTS AND MAINTENANCE MATERIALS. (RECEIPT SIGNED BY FIELD SUPERINTENDENT)**
 - ☐ **EVIDENCE OF COMPLIANCE WITH REQUIREMENTS OF GOVERNING AUTHORITIES (CERTIFICATES OF INSPECTION ELECTRICAL).**
 - ☐ **CERTIFICATES OF INSURANCE FOR PRODUCTS AND COMPLETED OPERATIONS.**
 - ☐ **NOTARIZED STATEMENT THAT ONLY NON-ASBESTOS MATERIALS WERE INSTALLED ON THIS PROJECT.**
 - ☐ **FULLY EXECUTED CERTIFICATE OF SUBSTANTIAL COMPLETION: AIA G704.**
 - ☐ **CONTRACTOR'S WRITTEN FIVE-YEAR WARRANTY, MANUFACTURER'S WARRANTY, AND EXTENDED WARRANTIES (IF ANY REQUIRED).**
 - ☐ **PROJECT RECORD DOCUMENTS: SECTION 7800.**
 - ☐ **AS-BUILT DRAWINGS.**

EVIDENCE OF PAYMENT AND RELEASE OF LIEN

- ☐ **CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS: AIA G706.**
- ☐ **CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS - AIA G706A PRIME CONTRACTORS AND SUBCONTRACTORS.**
- ☐ **CONSENT OF SURETY TO FINAL PAYMENT AIA G707.**

REFER TO SCHOOL FACILITIES MANAGEMENT CONTRACT MANUAL AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. FINAL PAYMENT WILL NOT BE PROCESSED UNTIL ALL ITEMS INDICATED ARE RECEIVED.

END OF SECTION

YONKERS PUBLIC SCHOOLS
WESTCHESTER HILLS SCHOOL 29
WINDOW REPLACEMENT, MASONRY & SITE IMPROVEMENT PROJECT
WESTCHESTER HILLS SCHOOL 29 YPS# 10710

SECTION 028201
ASBESTOS REMOVAL AND DISPOSAL

PART 1 - GENERAL

1.01 Work Included

- A. The Contractor shall furnish all labor, materials, services, insurance, patents, and equipment necessary to perform the Work of this Contract. All work will be conducted in compliance with EPA, OSHA, and NYS regulations, any other applicable federal, state, and local regulations and in accordance with these specifications. In the event, there is a conflicting point between these provisions, the most stringent one shall apply.
- B. The work will involve the removal of all Asbestos Containing Materials and all Asbestos Waste from within the Work Zones in accordance with all applicable rules and regulations and this specification. Location of asbestos indicated is provided for guidance only. The Contractor shall be responsible for establishing quantities and locations. The project will take place at Westchester Hills School 29, 47 Croydon Road Yonkers, New York 10704.

Westchester Hills School 29 –Various Locations

- **Exterior Window Caulking & Glazing – Exterior Windows: 16,000 LF**
- **Door Caulking – Old Building – Exterior: 250 LF**
- **Tar Above Vents – Old Building – Exterior: 100 SF**
- **Vent Caulking – Old Building – Exterior: 100 LF**
- **Bathrooms Ceramic Tile Glue – 1000 SF**
- **12 x 12 & 9 x 9 Floor tile & Mastic – 24,000 SF**

Removal shall be performed in accordance with New York State Industrial Code Rule 56 and the Contract Documents.

The project shall be conducted as follows:

A. BASE BID – Westchester Hills School – Various Locations

Removal and disposal of approximately 16,000 LF of window Caulking & Glazing, 250 LF of Door Caulking, 100 SF of Vent TAR, 100 LF of Vent Caulking, 1000 SF of bathrooms ceramic tile glue, 24,000 SF of 12 x 12 floor tile & Mastic & 9 x 9 Floor tile & Mastic from various locations. Asbestos removal shall be conducted using full containment, exterior foam method & interior foam Method procedures in accordance with New York State Industrial Code Rule 56 and the contract documents. The contractor shall remove all asbestos and properly clean work area of all debris.

Note: 8000 LF of caulking and 8000 LF of glazing both contain asbestos and both needs to be abated. Window caulking is around the window frame and window glazing is around the glass.

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NOTE:

- 1) The abatement areas shown on the drawings are provided for guidance only and no claims are made as to their accuracy. **The Contractor is alone responsible for determining the actual abatement quantities. If quantities differ the Contractor is responsible for bringing the discrepancy to the Construction Manager/Engineer's attention before any removal work proceeds.**
- 2) **In the event that clearance samples do not pass, the Asbestos Abatement Contractor will be responsible for all costs associated with resampling until acceptable clearance levels have been obtained.**
- 3) Removal of the asbestos containing materials from this building will be conducted in accordance with NYS Industrial Code Rule 56 and the contract documents. The contractor may use project specific variances from NYS ICR 56 to perform the asbestos abatement work. To utilize a project specific variance, the contractor shall submit a copy of the proposed variance that outlines the removal procedures to the engineer for review and approval before the commencement of any work.
- 4) Removal of the asbestos containing materials from this building will be conducted in accordance with NYS Industrial Code Rule 56, applicable variances, a site-specific variance (if required) and the contract documents.
- 5) During the project, other trades will be working in the building, the Asbestos Contractor shall coordinate all of his work with the other trades as required.
- 6) The Contractor is responsible for using " standard of care " when applying or removing tape, spray adhesive or any other type of bonding material from the walls, floors or ceilings. If damage is sustained to an area during the work procedure directly related to the negligence of the contractor, then that Contractor is responsible for returning the area to its original condition unless otherwise noted.
- 7) Critical barriers and the doorways shown on the drawing shall be covered with three layers of at least six-mil polyethylene sheeting sealed with tape.
- 8) The Contractor shall be responsible for all utility cable protection within the Work Zone Limits.
- 9) The Contractor is required to abide by the most current Prevailing Wage Rates at the time of the abatement project.
- 10) The Contractor shall furnish all labor, materials, services, insurance, patents, and equipment necessary to carry out the removal operation. All work will be conducted in compliance with EPA, OSHA, and NYS regulations, and any other applicable federal, state, and local regulations and in accordance with these specifications. In

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the event, there is a conflicting point between these provisions, the most stringent one shall apply.

1.02 Definitions

- A. ABATEMENT: Procedures to control fiber release from Asbestos-Containing Materials. This includes encapsulation, enclosure, and removal.
- B. AIRLOCK: A system for permitting egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two Curtained Doorways at least 3 feet apart.
- C. AIR MONITORING: The process of measuring the fiber content of a specific volume of air in a stated period of time.
- D. AREA MONITORING: Sampling of asbestos fiber concentrations within the asbestos control area and outside the asbestos control area, which is representative of the airborne concentrations of asbestos fibers in the breathing zone.
- E. AMENDED WATER: Water containing a wetting agent or surfactant.
- F. ASBESTOS: Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumington-grunerite), crocidolite (riebeckite), tremolite, anthophyllite, and actinolite.
- G. ASBESTOS CONTAINING MATERIAL (ACM): Any Asbestos or any material containing more than one percent of Asbestos by weight or volume.
- H. ASBESTOS CONTAMINATED OBJECTS: Any object which has been contaminated by Asbestos or Asbestos Containing Material. This shall include all unprotected porous materials in an Asbestos Work Area.
- I. ASBESTOS CONTROL AREA: An area where Asbestos Abatement operations are performed, which is isolated by physical boundaries to prevent the spread of asbestos dust, fibers, or debris.
- J. ASBESTOS WASTE: Any Asbestos Containing Material or Asbestos Contaminated Objects requiring disposal.
- K. AUTHORIZED VISITOR: The Owner, the Engineer, or a representative of any regulatory or other agency having jurisdiction over the project.
- L. CLEAN ROOM: An uncontaminated area or room which is part of the Worker Decontamination Enclosure System, with provisions for storage of workers' street clothes and protective equipment.
- M. COMPETENT PERSON: One who is capable of identifying existing asbestos hazards in the Work place and who has the authority to take prompt corrective measures to eliminate them as specified in 29 CFR 1926.32(f); Reference 29 CFR 1926.58(b) for duties and responsibilities.

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- N. CRITICAL BARRIER: Any windows, HVAC diffusers (exhaust or return), pipe sleeves, penetrations, doorways or any other openings leading to an occupied area of the building or to the outside.
- O. CURTAINED DOORWAY: A device to allow egress from one room to another while permitting minimal air movement between the rooms, typically constructed of three overlapping sheets of plastic over an existing or temporary door frame. Attach a weight to each sheet and seal at alternating edges so as to produce a zig-zag pattern of entrance or exit.
- P. ENCAPSULANT: A liquid material which can be applied to Asbestos-Containing Material and which controls the possible release of Asbestos fibers from the Asbestos Containing Material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). This may also be used to seal surfaces from which asbestos containing materials have been removed.
- Q. ENCAPSULATION: All herein specified procedures necessary to coat materials with an encapsulant to control the possible release of Asbestos fibers into the ambient air.
- R. ENCLOSURE: All herein specified procedures necessary to complete enclosure of Asbestos Containing Materials behind an airtight and impermeable barrier.
- S. EQUIPMENT ROOM: A contaminated area or room which is part of the Worker Decontamination Enclosure System, with provisions for the storage of contaminated clothing and equipment.
- T. FIXED OBJECT: A unit of equipment or furniture in the Work Zone which cannot be removed from the Work Zone.
- U. FRIABLE ASBESTOS MATERIAL: An Asbestos Containing Material that can be crumbled, pulverized, or reduced to powder when dry, by hand pressure or will crumble, be pulverized or produce powder when subjected to specific mechanical operation.
- V. HEPA FILTER: A high efficiency particulate air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 micrometers in diameter.
- W. HEPA VACUUM EQUIPMENT: High efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be of 99.97% efficiency for retaining fibers of 0.3 micrometers or larger.
- X. HOLDING AREA: A chamber between the Washroom and an uncontaminated area in the Waste Decontamination Enclosure System. The Holding Area comprises an airlock.
- Y. MOVABLE OBJECT: A unit of equipment or furniture in the Work Zone which can be removed from the Work Zone.
- Z. NEGATIVE PRESSURE SYSTEM: A local exhaust system equipped with HEPA filtration that is capable of maintaining a minimum pressure differential of minus 0.05 inch of water column relative to adjacent unsealed areas.

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- AA. NON-FRIABLE ASBESTOS MATERIAL: An Asbestos Containing Material in which the fibers have been locked in by a bonding agent, coating, binder, or other material so that the Asbestos is well bound and that when dry cannot be crumbled, pulverized or reduced to powder by hand pressure and will not be subject to mechanical operations.
- BB. PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM: A Decontamination Enclosure System for Workers, typically consisting of an Airlock, an Equipment Room, a second Airlock, a Shower room, a third Airlock, and a Clean Room.
- CC. PERSONAL MONITORING: Sampling of airborne asbestos fiber concentrations within the breathing zone of an employee.
- DD. REMOVAL: All herein specified procedures necessary to strip all Asbestos Containing Materials from the designated areas.
- EE. SHOWER ROOM: A room between the Clean Room and the Equipment Room in the Worker Decontamination Enclosure System, with hot and cold running water and suitably arranged for complete showering during decontamination. The Shower Room comprises an airlock between the Equipment Room and the Clean Room.
- FF. SURFACTANT: A chemical wetting agent added to water to improve penetration of water into the Asbestos Containing Materials.
- GG. TIME WEIGHTED AVERAGE (TWA): An 8-hour time weighted average of airborne fiber concentration per cubic centimeter of air. Three samples are required to establish the 8-hour time weighted average.
- II. WASHROOM: A room between the Work Zone and the Holding Area in the Waste Decontamination Enclosure System. The Washroom comprises an airlock.
- JJ. WASTE DECONTAMINATION ENCLOSURE SYSTEM: A Decontamination Enclosure System for materials and equipment, typically consisting of an Airlock, a Washroom, a second Airlock, and a Holding Room.
- KK. WET CLEANING: The process of eliminating Asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as Asbestos Waste.
- LL. WORK SITE: Premises where Asbestos Abatement is taking place. The Work Site includes, but is not limited to the Work Zone, the Personnel and Waste Decontamination Systems, the staging area, the disposal route and the loading dock.
- MM. WORK ZONE: Any area indicated on the Drawings as Asbestos Abatement areas or as areas with Asbestos Containing Material.

1.03 Submittals

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A. Submit the following items to the Engineer for review twenty (20) days prior to the commencement of Work associated with this section:

1. EPA Notification: The form required by the Environmental Protection Agency in accordance with the National Emission Standard for Asbestos, 40 CFR Part 61.
2. New York State Department of Labor Notification: The form required by the State of New York Asbestos Control Program in accordance with Article 30 of the New York State Labor Law.
3. Any proposed project specific variance to any of the applicable regulations.

Upon return of submittals from the Engineer with an action stamp indicating that the submissions have been reviewed and comply with the contract documents, file all notifications with the appropriate agencies in accordance with all applicable regulations and these specifications. Pay the appropriate fees. All filing fees and associated costs shall be borne by the Contractor.

B. Submit the following items to the Engineer for review ten (10) days prior to the commencement of Work associated with this section. No Work shall begin until ALL submittals are returned with an action stamp indicating that the submission is in accordance with these specifications.

1. NOTIFICATIONS: Stamped received copies of the notifications (EPA only) and variances listed above in item A, as well as copies of the canceled checks used to pay all associated fees.
2. CONTRACTOR'S CERTIFICATION: Documentation confirming licensing by New York State Commission of Labor for asbestos Work in accordance with Industrial Code Rule 56.
3. WORKER DOCUMENTATION: Current copies of the AHERA certificates, New York State Department of Labor Asbestos Handling Certificates, Medical Exams and Respirator Fit Tests for all employees performing the Work of this Section.
4. EMPLOYEE RELEASE FORM: Prior to allowing an employee to perform any Work on the project, submit the properly executed Employee Release Form for each employee. A copy of this form is included herein.
5. CONTINGENCY PLANS: A copy of emergency, security, and contingency plans as follows:
 - a. A plan to provide for emergency and fire evacuation of personnel from the Work Zone in an emergency. File a copy of this plan with the local fire and/or ambulance unit;
 - b. A plan for maintaining the security of the Work Zone. The security plan shall provide a means of preventing accidental or unauthorized entry. Provide security to the decontamination facility and all points of potential access to the Work Zone 24 hours per day during abatement. Submit the form of security and safety log that will be maintained on the project;

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- c. A contingency plan addressing emergencies, equipment failures, and barrier failure. Include the telephone numbers of at least three (3) responsible persons who shall be in the position to dispatch men and equipment to the project in the event of an emergency.
6. LANDFILL: Written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the New York State Department of Environmental Conservation (NYS Part 360 Permit) and by the US EPA. In the event the landfill is not located in New York State, approval from the agency having jurisdiction over the landfill must be received. Documentation that the proposed hauler and landfill have the proper permits and are willing to accept the asbestos waste.

The hauler must have a Waste Transporter Permit pursuant to Article 27, Titles 3 and 15, of the Environmental Conservation Law from the New York State DEC, Division of Hazardous Substance Regulations (NYS Part 364 Permit).
7. MATERIAL SAFETY DATA SHEETS: For all products intended to be used on the project, a Materials Safety Data Sheet in accordance with the OSHA Hazard Communication Standard 29 CFR 1910.1200. Include a separate attachment indicating the specific worker protection equipment required for each material.
8. PRESSURE MONITORING DEVICES: Manufacturer's data on type of equipment to be used to provide a continuous record of pressure differentials. Provide a drawing showing locations and number of units to be used.
9. AIR FILTRATION DEVICES: Manufacturer's data on type of equipment to be used to remove airborne asbestos.
10. ROOM INSPECTION: Inspect all areas in which Work is to be performed. Inspection shall occur in the presence of representatives of the Owner and Engineer. Record any existing damage to components, such as walls, doors, windows, carpeting, fixtures, and equipment. Any damaged components found after completion of the Work will be repaired at the Contractor expense. Make arrangements for the inspection, notify the participants, record the findings, and issue minutes of the inspection to all participants.
11. SCHEDULES: A copy of construction, staffing, and equipment schedules:
 - a. A construction schedule stating critical dates of the job including start and completion of mobilization, activation, deactivation, and demobilization of all Work activities (including mobilization, Work Zone preparation, asbestos abatement, inspection and clearance monitoring, each phase of refinishing, and final inspections). Update schedule with each partial payment request. Changes in schedule are subject to the Engineer's approval and require three (3) days prior notice.
 - b. A schedule of staffing stating number of workers per shift, name and number of supervisor(s) per shift, hours per shift, shifts per day, and total days to be worked;

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- c. A schedule of equipment to be used including numbers and types of all major equipment such as high efficiency particulate absolute (HEPA) air filtration units, HEPA vacuums, and airless sprayers.
- 12. INSURANCE POLICIES: A copy of all Insurance policies required by this contract, including the *Asbestos Abatement General Liability Occurrence Insurance*, without a sunset clause, in amounts not less than \$1,000,000, each occurrence, naming the Owner as the Certificate Holder. Also, include insurance policies of any subcontractor, including the Sudden and Accidental Pollution Liability Insurance required of the Hauler. The following list of Additionally Insured must be included under insurance policies held by the Contractor on this project:
 - a. Yonkers Public Schools District and its employees
 - b. Fuller & D'Angelo P.C. and its employees
 - c. Warren & Panzer Engineers and its employees
 - d. Barile & Gallagher Associates and its employees
- 13. AIR SUPPLY SYSTEM: Manufacturer's product information for each component used in the Type "C" supplied air respiratory system, including NIOSH and MSHA Certifications for each component in an assembly and/or the entire assembly. Provide a notarized certification that the system is capable of providing Grade "D" breathable air. Submit a copy of the manufacturer's operations manual for the air purification system and the carbon monoxide monitor.

Prepare a drawing showing the assembly of components into a complete supplied air respiratory system. Document the number and size of electric air pumps and/or air supply tanks to be kept at the site at all times to ascertain that sufficient air is being supplied to the maximum number of users. Prepare a diagram showing the location of the electric air pumps, the air supply tanks and the hose line connections. The use of gas compressors will not be allowed. Submit complete operating and maintenance instructions for all components and systems as a whole. Bind manual in a form suitable for field use.

- C. Daily during the conduct of abatement activities, submit to the Engineer the following:

Printouts from pressure differential monitoring equipment marked with date and Work start/stop times for each day. Use printout paper that indicates elapsed time in intervals no greater than one hour. Indicate on each day recording times of starting and stopping abatement Work, type of Work in progress, breaks, and filter changes. Cut printout into segments by day and label with project name, Contractor's name and date;
- D. Within thirty (30) days of removal from the premises, submit to the Owner the disposal certificate(s) from the landfill receiving the Asbestos Waste stating dates and quantities received.
- E. Within seven (7) days of completion of all Work associated with this Section submit to the Owner, the following:

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1. A bound copy of the job log book showing sign in and sign out of all persons entering the Work Zone, including name, date, time, and position or function and a general description of daily activity. Keep these records on file for the duration of employment plus 30 years;
2. A notarized statement attesting that all personnel performing any work under this Contract were compensated in accordance with the prevailing wage rates contained herein.

1.04 Special Reports

- A. Except as otherwise indicated, submit special reports directly to the Owner and the Engineer within one (1) day of the occurrence requiring the special report, with copies to all others affected by the occurrence.
- B. When an event of unusual and significant nature occurs at the site (examples: failure of negative pressure system, rupture of temporary enclosures, unauthorized entry into Work Zone), prepare and submit a special report listing date and time of event, chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information.
- C. Report any accidents, at the site and anywhere else Work is in progress related to this project. Record and document data and actions. Comply with industry standards.

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1.05 Quality Assurance

- A. Where methods or procedures are specified, they shall constitute minimum measures and shall in no way relieve the Contractor of sole responsibility for the means, methods, techniques, sequences, or safety measures in connection with the Work.
- B. Provide foremen who speak fluent English to supervise all abatement activities. Foremen shall be certified as handler supervisors in accordance with Section 902 of the New York State Labor Law Article 30, and have experience in this field and can furnish a record of satisfactory performance on at least three (3) projects for Work of comparable type.
- C. Any proposed Subcontractor performing any Work under this Section "Asbestos Removal and Disposal" shall have similar qualifications. Submit qualifications with the BID for any proposed Subcontractor. Submit Subcontractor qualifications in the same form and quantity as required for the Contractor.

1.06 Applicable Standards and Regulations

- A. Perform all Work in compliance with the most current version of all pertinent laws, rules, and regulations, existing at the time of Work, including, but not limited to:
 - 1. Code of Federal Regulations
 - a. Title 29 CFR Parts 1910.1001, 1910.1200, 1910.134 1926.58 and 1926.1101;
[The Occupational Safety and Health (OSHA) Standards]
 - b. Title 30 CFR Part 61, Subpart G;
[The Transport and Disposal of Asbestos Waste]
 - c. Title 40 CFR, Part 61, Subparts A and M;
[The EPA National Emission Standard for Hazardous Air Pollutants, and the National Emission Standard for Asbestos]
 - d. Title 40 CFR, Part 763,
[Asbestos Containing Materials in Schools; Final Rule and Notice]
 - e. Title 49 CFR Parts 106, 107, and 171-179.
[The Transportation Safety Act of 1974 and the Hazardous Material Transportation Act]
 - f. Public Law 101-637
[ASHARA]
 - 2. New York State Official Compilation of Codes, Rules and Regulations.
 - a. Title 12 Part 56

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- b. Title 10 Part 73
 - c. Title 6 Parts 360-364
 - d. Labor Law - Article 30 and Sections 900-912.
 - e. All applicable Additions, Addenda, Variances and Regulatory Interpretation Memoranda.
3. Applicable Standards
- a. The American National Standard Institute (ANSI) Practices for Respiratory Protection ANSI Z88.2-1980.
 - b. The American National Standard Institute (ANSI) Fundamentals Governing the Design and Operation of Local Exhaust Systems.
 - c. UL 586 Test Performance of High Efficiency Particulate Air-Filter Units.
- B. In the event, there is a conflicting point between these provisions, the most stringent one shall apply.

1.07 Air Monitoring

- A. Conduct personnel air monitoring in accordance with OSHA requirements. Collect a sufficient number of samples to determine the Time Weighted Average exposure of twenty percent (20%) of the work force.
- B. The Owner will provide area air monitoring as follows:

<u>Sample Type</u>	<u>Analysis Method</u>
Pre-abatement	PCM
During abatement activities	PCM
Clearance air monitoring	PCM & TEM

The Contractor shall cooperate with the Owner's designated representatives with regard to air monitoring and project monitoring procedures. Ensure that employees and Subcontractors do the same.

- C. If analysis of any of the air samples collected during abatement indicates that the airborne asbestos concentration outside the Work Zone is greater than or equal to 0.01 f/cc or the background level, whichever is greater:
- 1. Stop Work immediately;
 - 2. Inspect the integrity of the barriers;
 - 3. Wet clean and vacuum the location where elevated fiber counts were reported; and

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4. Do not resume Work until such time when the airborne asbestos concentration outside the Work Zone is once again less than the above limit.
- D. In order to pass PCM clearance testing, the analysis of each and every sample collected shall indicate that the airborne fiber concentration is less than 0.01 fibers per cubic centimeter or the background level whichever is greater.
- E. In order to pass TEM clearance testing, each and every sample collected shall indicate that the airborne structure concentration is less than 0.01 structures per cubic centimeter or the background level whichever is greater and the average structure concentrations inside the Work Zone shall not be statistically larger than the average of ambient levels as determined by the Z-test.
- F. The method of sampling shall be aggressive or nonaggressive depending on the requirements of applicable regulations. The method of analysis for pre-abatement and during abatement shall be NIOSH 7400 using Phase Contrast Microscopy (PCM). Post-abatement samples shall be analyzed by Transmission Electron Microscopy (TEM) for AHERA compliance projects, in accordance with Appendix A to Subpart E-Interim TEM Analytical Methods. For non-AHERA projects, the decision of testing with either PCM or TEM for final air clearance monitoring will be made by the Engineer. The testing laboratory will be a member of the Environmental Laboratory Approval Program (ELAP).
- G. In case of failure of the initial final air clearance monitoring, the work zone will be retested following immediate relearning. This process will be repeated as necessary until final air clearance is obtained. All costs and expenses resulting from the additional relearning and retesting (including sampling and analysis) due to failure of the initial final air clearance shall be borne by the Contractor. The expenses thereby incurred will be deducted from any monies due or that may become due to the Contractor.
- H. The Contractor shall provide security personnel to watch the decontamination facility and all points of potential access to the Work Zone.

- END OF PART 1 -

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PART 2 - PRODUCTS

2.01 Air Filtration Unit

- A. Use only Air Filtration Units in compliance with ANSI Z9.2 (1979), Local Exhaust Ventilation. The final filter in each unit shall be of the HEPA type. Use only Air Filtration Units certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 micron dioctylphthalate (DOP) particles.
- B. Equip the system with the following:
 - 1. An automatic shutdown that will stop the fan in the event of a rupture in the HEPA filter or blocked air discharge;
 - 2. Warning lights and/or alarms to indicate an excessive pressure drop across the filters or an insufficient pressure drop across the filters;
 - 3. A non-resettable elapsed time meter to indicate the total accumulated hours of operation;
 - 4. A gauge or manometer to measure the pressure drop across the filter.

2.02 Asbestos Caution Signs

- A. Use Asbestos Caution Signs as specified in OSHA Title 29 CFR 1910.1001(j) and 1926.58(k). Posting of warning signs in and around the work site should be in cooperation with the Department of Correction and with approval by the Department of Correction.

2.03 Asbestos Caution Labels

- A. Use Asbestos Caution Labels as specified in OSHA Title 29 CFR 1910.1001(j) and 1926.58(k).

2.04 Disposal Bags

- A. Use Disposal Bags which are a minimum six (6) mil in thickness, clear in color and preprinted with the Asbestos Caution Label.

2.05 Encapsulating Material

- A. All Encapsulating Materials shall be approved by UL for use in class 1A buildings and shall have composite fire and smoke hazard ratings as tested under procedure ASTM E- 84, NFPA 255 and UL 723

Flame Spread	25
Smoke Developed	50

- B. If the removal of fireproofing materials is included in this Contract, select an encapsulant from those approved by UL for use with the new fireproofing. If Retro-Guard Type RG or RG-1 manufactured by W.R. Grace & Co. is to be applied, use American Coatings 22P & 22 Power lock, or Fiber lock

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Fiber set FT and Fiber set PM, or Certane 909 and 1000, or H.B. Fuller 32-60 and 32-61, or IPC Serpliflex and Serpiloc.

2.06 Equipment

- A. Temporary lighting, heating, hot water heating units, ground fault interrupters, and all other equipment on site shall be UL listed and shall be safe, proper, and sufficient for the purpose intended.
- B. All electrical equipment shall be in compliance with the National Electric Code. Attention is specifically called to Article 305 Temporary Wiring.

2.07 First Aid Kits

- A. Maintain adequately stocked first aid kits in the Clean Room and Work Zone, in accordance with OSHA requirements.

2.08 High Efficiency Particulate Air (HEPA) Filters

- A. Employ filters which have been individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 micron dioctylphthalate (DOP) particles, in accordance with Military Standard Number 282 and Army Instructional Manual 136-300-175A. Each filter shall bear a US 586 label to indicate ability to perform under the specified conditions.
- B. Each HEPA filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of air flow.

2.09 Glove bags

- A. Use only commercially available Glove bags. Use Glove bags constructed of clear fire retardant plastic, which have a minimum thickness of six (6) mil.
- B. Use Glove bags appropriately sized for the pipe. Use Glove bags, the dimensions of which exceed the pipe insulation diameter by a factor of four (4).

2.10 Plastic

- A. Use only new fire-retardant plastic sheets of polyethylene, which has a minimum thickness of 6 mil, true grade.
- B. For the initial floor, protective layer use only new reinforced plastic sheets of polyethylene, which has a minimum thickness of ten (10) mil, true grade. As an alternative, apply a ten (10) mil thick layer of "Spray-Poly" by Isotek or as approved.

2.11 Plywood

- A. Use only fire-rated CDX plywood, which is at minimum one half inch (1/2") in thickness.

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2.12 Respirators

- A. Use only respirators approved by the Mine Safety and Health Administration (MSHA), Department of Labor, or the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

2.13 Sealants

- A. Use a combination fire stop foam and fire stop sealant. Use Dow Corning Fire Stop Foam and Dow Corning Fire Stop Sealant or as approved. Apply in accordance with manufacturer's recommendations.

2.14 Studs

- A. Use only 2" x 4" fire-rated CDX or metal studs.

2.15 Supplied Air System

- A. At all times, air supplied to the type "C" respirators shall be Grade "D" Breathable Air as described by OSHA Regulation 29 CFR 1910.134(d)(1), containing less than the following:

Carbon Monoxide :	20 parts per million
Carbon Dioxide :	1,000 parts per million
Condensed Hydrocarbons:	5 milligrams per cubic centimeter
Objectionable odors:	None

- B. Provide a minimum of one (1) hour of reserve air for emergency evacuation. Post, in the Work Zone, emergency evacuation procedures to be followed in the event of breathing air system failure. Explain procedures to all workers prior to commencement of the Work.
- C. Water content shall be less than 66 parts per million in order to protect the air purification unit. Certify the air quality of the system prior to beginning asbestos abatement Work and every two weeks during asbestos abatement Work by an independent laboratory certified by the American Board of Industrial Hygiene. Collect samples under the supervision of a Certified Industrial Hygienist. Submit copies of certified test results to the Engineer within five (5) days of the sample collection.

2.16 Vacuums

- A. Use only vacuums equipped with HEPA filters.

2.17 Wetting Agents

- A. The wetting agent shall be water amended with one (1) oz. of a chemical surfactant per five (5) gallons of water. The composition of the surfactant shall be approximately 50% polyoxyethylene ether and 50% polyoxyethylene esters.

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PART 3 - EXECUTION

3.01 Personnel Protection

- A. Satisfy all applicable Worker protection requirements.
- B. Provide protective equipment for use by Workers and designated representatives of the Owner including disposable full body coveralls, respirators and approved cartridges, gloves, hard hats, and goggles. Maintain on site, two (2) sets of protective equipment for the exclusive use of representatives of the owner.
- C. At all times, provide all persons with personally issued and marked respiratory equipment suitable for the asbestos exposure level in the Work Zone. Ensure that all persons properly use this equipment at all times.
- D. As a minimum, half face negative pressure type respirators must be worn by all personnel during Work Zone preparation. If airborne concentrations of asbestos inside the Work Zone exceed 0.1 fibers per cubic centimeter, employ either PAPR or type "C" respiratory protection whichever is appropriate.
- E. PAPRs (Powered Air Purifying Respirators) shall constitute the minimum level of respiratory protection for all persons entering that Work Zone from the time the Work Zone is activated until acceptance.
- F. Should airborne concentrations of asbestos inside the Work Zone exceed 2.0 fibers per cubic centimeter, supply all personnel with personally issued and marked Type "C" supplied air respirators operated in the positive pressure demand mode.
- G. If the permissible respirators fail to provide sufficient protection against volatile substances emitted by any sealants or other chemicals used, the services of a certified industrial hygienist will be procured, at the Contractor's expense, to determine proper respiratory protection. The Owner will not be liable for the cost of increased respiratory protection.
- H. Maintain surveillance of heat stress conditions in the Work Zone. The prevailing Threshold Limit Values (TLVs) for heat stress and the method of heat stress measurement adopted by the American Conference of Governmental Industrial Hygienists (ACGIH) shall govern worker exposure to heat stress.

3.02 Decontamination

- A. Construct and operate the Personnel and Waste Decontamination Enclosure Systems in conformance with all applicable rules and regulations. Locate decontamination units outside of the Work Zone.
- B. Construct the Personnel Decontamination Enclosure System (PDES) as a series of six (6) completely enclosed and connected rooms: An Airlock, an Equipment Room, a second Airlock, a Shower, a third Airlock, and a Clean (locker) Room. Separate rooms with curtained doorways.

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1. Ensure that all egress from the Work Zone is through the PDES.
 2. Ensure that all persons leaving the Work Zone vacuum themselves of asbestos in the Work Zone and disrobe in the Equipment Room, shower (including washing of hair) with respirator on, and redress in the Clean Room.
 3. Ensure that all persons entering the Work Zone wear clean and new protective clothing and equipment prior to entrance.
 4. Equip the Shower with hot and cold water adjustable at the tap, liquid soap, shampoo and disposable towels.
 5. Leave all contaminated clothing and equipment in the Equipment Room in barrels or bags. Sanitize respirators in the showers. Equip with fresh cartridges in the Clean Room.
 6. No more than one curtained doorway shall be opened at the same time.
- C. Remove all asbestos containing waste materials, equipment, or any other materials through the Waste Decontamination Enclosure System (WDES). The WDES shall consist of a series of four (4) completely enclosed and connected rooms: An Airlock, a Washroom, a second Airlock, and a Holding Area. Separate rooms with curtained doorways. Remove materials, waste and equipment as follows:
1. No more than one curtained doorway shall be opened at the same time.
 2. Before removing any equipment or asbestos from the Work Zone,
 - a. Containerize (or bag) all asbestos;
 - b. Wet clean all equipment and packaged asbestos.
 3. Place equipment and asbestos in the first Airlock. Workers in the Work Zone shall not enter the Airlock and the Curtained Doorway between the Airlock and the Washroom shall remain closed during this procedure.
 4. Uncontaminated Workers in clean new protective equipment shall enter the WDES from outside the Work Zone and enter the Washroom.
 5. While in the Washroom:
 - a. Remove Waste and Equipment from the first Airlock;
 - b. Wet clean all equipment and all packaged asbestos containing waste;
 - c. Place bags and other containers into an additional completely clean bag or wrap in plastic. Bags and plastic used for this purpose shall not enter the Work Zone;

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- d. Place equipment and asbestos in the second Airlock. Workers in the Work Zone shall not enter the Airlock and the Curtained Doorway between this Airlock and the Holding Area shall remain closed during this procedure.
6. Uncontaminated Workers in clean new protective equipment shall enter the Holding Area from the outside area and remove containerized materials from the airlock.
7. All workers shall proceed into the Work Zone for exiting by way of the PDES. Ensure that personnel do not leave the Work Zone through the WDES.

3.03 Work Zone Preparation

- A. Electrical Power: Unless otherwise indicated, shut down all electric power within the Work Zone, as follows:
 1. Lock all circuits, which have been shut off, in the off position and label with a printed tag which reads as follows:

"TEMPORARY DISCONNECT
Due to Asbestos Removal Project
DO NOT ACTIVATE THESE CIRCUITS"
 2. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment per applicable electrical code requirements. Provide all equipment which must remain operable, as well as all temporary ground-fault interrupter circuits for lights and electrical equipment. Individually protect all power equipment used inside each Work Zone with in-line ground fault interrupters. Locate ground-fault interrupter outside of the Work Zone.
 3. Provide all electrical tie-ins and extensions. Provide a temporary panel board, connected to an electric panel designated by the Owner.
- B. Heating Ventilation and Air Conditioning (HVAC): Employ all means necessary to prevent contamination and fiber dispersal to other areas of the structure, as follows:
 1. Thoroughly clean all HVAC Equipment and ductwork in the Work Zone. Seal all vents within the Work Zone with tape and plastic. Seal all HVAC duct seams. Wrap all ductwork in two (2) layers of plastic.
 2. Remove all HVAC filters. Pack disposable filters in sealable double plastic bags for disposal at the approved landfill. Replace with new filters after final cleanup. Wet-clean permanent filters; reinstall after final cleanup.
 3. Remove all heating and ventilating equipment grills, diffusers, returns, and other items located on the asbestos bearing surfaces. Wet clean all such items, seal in two (2) layers of plastic and remove from the Work Zone. Reinstall all displaced items after satisfactory clearance air testing.

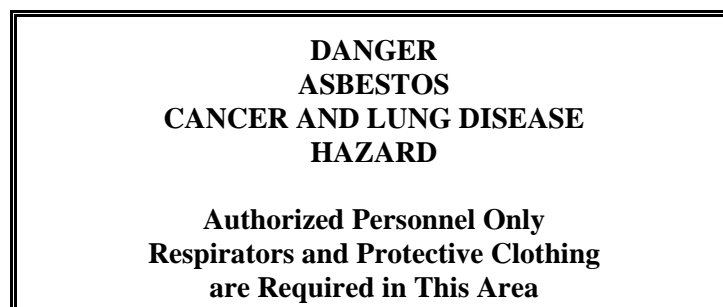
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4. HVAC systems shall be treated as follows:
 - a. Unless otherwise indicated, shutdown and lockout all heating, ventilating and air conditioning systems. Isolate system at points of entry to the Work Zone; use two (2) layers of plastic.
 - b. In cases where the HVAC system serving the Work Zone also serves other areas of the building which must remain in operation,
 - i. Isolate the ductwork entering the Work Zone from the remainder of the system. Cap all ductwork where it passes in or out of the Work Zone with galvanized steel ASTM 5261 in accordance with SMACNA HVAC Duct Construction Standards. Cover with two (2) layers of plastic.
 - ii. Operate the affected HVAC system twenty-four (24) hours per day from the initiation of Work Zone activation until successful final air clearance. Maintain a positive pressure within the operational portion of the HVAC system of 0.05-inch water gauge or greater with respect to the ambient pressure outside of the Work Zone. Install pressure monitoring devices.
 - c. In cases where it is necessary for ductwork passing through the Work Zone to remain active, the following conditions are to be maintained:
 - i. Maintain a positive pressure within the HVAC system of 0.05-inch water gauge (or greater) with respect to the ambient pressure outside of the Work Zone: the conditions for this system shall be maintained and be operational twenty-four (24) hours per day from the initiation of Work Zone preparation until successful final air clearance.
 - ii. Test, inspect and record the positive pressure in the duct both at the beginning and at the end of each shift.
 - iii. Monitor the positive pressurization of the duct using instrumentation that will trigger an audible alarm, if the static pressure falls below the set value.
 - iv. Place the supply air fan and the supply air damper for the active positive-pressurized duct in the manual "on" position to prevent shutdown by fail safe mechanisms.
 - v. Shut down and lock out the return air fan and the return air dampers.
 - vi. Cover all active HVAC ducts that pass through the Work Zone with two (2) layers of plastic.
- C. Steam Systems: Unless otherwise noted on the Drawings, shut down all steam systems passing through the Work Zone prior to activation.

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- D. Utilities: Provide all water, electrical and waste facility connections, as well as all sanitary drains. The Contractor will not be charged for water used, electricity consumed, or discharges made to sanitary sewers as a part of this project.
- E. Temporary Service Lines: Upon completion of abatement activities, remove all temporary service lines and restore to their original conditions, in a manner acceptable to the Engineer. Repair any part of the permanent service lines, equipment and building facilities disturbed or damaged as a result of the installation or removal of the temporary service lines.
- F. Temporary Heating: Provide temporary heating in the Work Zone, as needed to maintain a minimum temperature of 50°F. Heating equipment shall be approved by the Engineer.
- G. Movable Objects: Before Work is initiated, clean all items which can be removed without disrupting any asbestos material. Pre-clean movable objects within the proposed areas using HEPA filtered vacuum equipment an/or wet cleaning methods as appropriate; remove such objects from Work Zones to a temporary location, as directed by the Engineer.
- H. Fixed Objects: Pre-clean non-removable objects within the proposed Work Zones, using HEPA filtered vacuum equipment and wet cleaning methods as appropriate prior to abatement activities, and enclose with two (2) layers of plastic sealed with tape.
- I. Openings: Prior to placing plastic on walls, floors and ceilings, seal off all openings, including, but not limited to corridors, doorways, windows, skylights, ducts, grills, diffusers, and any other penetrations of the Work Zones, with two (2) layers of plastic sealed with tape.
- J. Floor, Wall and Ceiling Penetrations: Prior to any abatement activities fire stop all openings or penetrations that have not already been sealed. This includes both empty holes, expansion joints and holes accommodating items such as cables, pipes, ducts, conduit, etc.
- K. Fire Exits: Maintain emergency and fire exits from the Work Zones, or establish alternative exits satisfactory to the local fire officials. Provide panic exit devices for security and egress. Establish this exit in accordance with all applicable codes and regulations.
- L. Signs: Outside of the perimeter barrier and at all entrances and exits to the Work Zone, post signs in English, Spanish and any other language spoken at the project location.

1. The signs shall read:



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2. Demarcate the regulated area. Post signs at such a distance from the area that an employee will read these signs before entering the area.
- M. All of the above procedures shall be completed prior to the disturbance of any asbestos containing material.

3.04 Engineering Controls

- A. Maintain the Work Zone at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of 0.05 inches of water.
- B. From the start of abatement activities:
1. Operate air filtration units continuously during the project, twenty-four (24) hours a day, from the start of abatement through successful clearance air monitoring, in accordance with "Specifications and Operating Procedures for the Use of Negative Pressure Systems for Asbestos Abatement", Guidance for Controlling Asbestos-Containing Materials in Buildings, EPA Report Number 560/5-85-024 (1985).
 2. Install the air filtration units in quantities and locations as required in order to achieve the required negative pressure.
 3. Provide a minimum of one air change every ten (10) minutes for the area under negative pressure. Assume Air Filtration Units will operate at 50% of their rated capacity. Maintain on site, one (1) spare air filtration unit for every five (5) in use.
 4. Locate the exhaust unit(s) so that makeup air enters the Work Zone primarily through the Decontamination Systems and traverses the Work Zone as much as possible. Provide the specified number of air changes throughout the Work Zone. Place the end of the unit or its exhaust duct through an opening in the plastic barrier or wall covering. Seal the plastic around the unit or exhaust duct with tape.
 5. Whenever possible, exhaust air filtration units to the outside of the building away from occupied areas in such a manner so that the air intake ports, louvers, or entrances for the building or adjacent buildings will not be adversely affected. In cases where it is impossible to exhaust outside of the building, provide a second air filtration unit in series. For runs longer than 150 feet install additional air filtration units every 150 feet.
 6. Use ducting, of equivalent or larger dimension as that of the air filtration unit exhaust port, to exhaust to the outside of the structure. Ducts shall exhaust, at minimum fifty (50) feet from all intakes or entrances to the building or adjacent buildings. Seal and brace all ductwork. Maintain airtight joints. Prevent fiber release into uncontaminated building areas.
 7. Place the air filtration system exhaust ducts overhead in an inconspicuous, non-restricting fashion. Connect the ducts to a 14" flange, as shown on the Drawings.

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8. All filters shall be accessible from the Work Zone or contaminated side of the barrier. Prior to initial use, replace all filters in air filtration units in the presence of the Engineer with new and unused filters.
9. Use a dedicated power supply for the air filtration units.
10. In the event of loss of negative pressure or electric power to the negative pressure ventilating units, stop all abatement Work immediately. Do not resume Work until power is restored and negative pressure equipment is operational. Under no circumstances shall any Asbestos abatement take place without having the negative air pressure system fully operational.
11. When loss of negative pressure equipment lasts, or is expected to last longer than one-half hour:
 - a. Seal airtight all auxiliary make-up air inlets;
 - b. Seal all Decontamination Systems airtight after the evacuation of all personnel from the Work Zone;
 - c. All adjacent areas will be monitored by the Engineer at the Contractor's expense for asbestos fiber concentration.
12. Use ventilation smoke tubes to check the system performance.
13. Monitor and record the pressure differential between the Work Zone and the outside of the Work Zone with a monitoring device incorporating a continuous recorder (e.g. strip chart). Equip with an audible alarm which will signal if the pressure differential drops below 0.05 inches of water.

3.05 Asbestos Removal

Modified Containment Procedures (Floor Tile and Mastic)

Work in this part shall be performed in accordance with ICR 56, Applicable Variances AV-120 and the contract documents.

The sequence of abatement activities shall be as follows:

- A. Modified Containment, completely isolate the Work Zone as shown on the Drawings. Extend the Work Zone to such limits as to permit the removal of all asbestos containing materials within the Work Zone. Isolate the Work Zone as follows:
 1. Construct the Remote Decontamination Units for personnel and waste, as shown on the Drawings. Use studs, sixteen inches on center, covered with plywood and two (2) sheets of plastic.
 2. Construct isolation barriers. Where feasible, use existing walls and partitions. Where necessary, frame temporary partitions with studs sixteen (16) inches center on center. To support plastic for all areas larger than thirty-two (32) square feet, except where one of the

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dimensions is less than one (1) foot, reinforce temporary partitions with plywood. Test the negative pressure system to ensure that the 0.05-inch differential is present.

3. Construct an entrance/exit airlock chamber, a minimum of 5' X 5' in size, at the entrance to each work zone so as to allow each worker to remove their outer suit, wipe off their inner suit and don a clean suit before proceeding to the remote decontamination enclosure system. ACM shall be bagged and brought to the Decontamination Enclosure System. At the Decontamination Enclosure, the bags will be wet wiped and the waste double bagged.
4. Cover the floor of the decontamination unit and airlock with reinforced polyethylene sheeting.
5. Cover interior surfaces of the Work Zone with a layer of plastic sealed with tape. Cover the walls with plastic from the floor level to a height of 4' minimum. Overlap seams in plastic 12" minimum and seal with tape. In areas where floor carpet is to remain, cover the floor with an additional layer of reinforced polyethylene sheeting. The plastic shall be attached with adhesives, furring strips and screws, tape, staples, etc., sufficient to prevent collapse or sagging of any plastic covering. **Inspect all plastic three times a day for sagging and repair all such sags or failures immediately.**
6. Install a second layer of plastic on all interior Work Zone Surfaces. Repeat procedure detailed above in 3.05. A.5.
7. Where required, electrical, telephone equipment, ductwork, etc. shall be covered with three (3) layers of six (6) mil polyethylene sheeting. Energized circuits will be posted with signs warning 'CAUTION - ELECTRICALLY ENERGIZED', in three-inch-high letters.
8. Secure a source of water within the Work Zone (other than the Shower within the Decontamination Zone) for wetting and cleaning.
9. Test the negative pressure system prior to any abatement actions to ensure that the 0.05-inch differential is present. Wait twelve (12) hours. Test system again. If the test results are acceptable to the Engineer, the Work Zone will be activated. Do not disturb Asbestos containing materials prior to activation.
10. Wet all Asbestos prior to removal using a wetting agent. Maintain asbestos wet until packaged for disposal.
11. Upon removal of the floor tile and mastic, directly bag or drop into a flexible catch basin all asbestos containing waste material.

ALL ACM shall be bagged immediately and brought to the Waste Decontamination Enclosure System. At the Decontamination Enclosure, the bags will be wet wiped and the waste double bagged.

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3.06 Encapsulation

- A. Apply Encapsulating material using an airless sprayer. Comply with manufacturer's recommendations. The Encapsulating material shall be mixed with contrasting color paint to assure proper application.

3.07 Disposal Practices

- A. Wet and properly package all Asbestos prior to removal from the Work Zone via the Waste Decontamination Enclosure System. Remove all residual asbestos from the exterior of any package, drum, bag, or other container of Asbestos prior to removal from the Work Zone. Affix the ASBESTOS CAUTION label, the name of the Owner, the name of the Contractor, the name of any Tenant and the location where generated to all packages, drums, bags or other containers used for Asbestos disposal.
- B. Store all Asbestos Waste in a totally secure manner. Transport all Asbestos Waste to the disposal site within seven (7) days after completing the Work of this section or thirty (30) days after removal, whichever comes first.
- C. Transport Asbestos Waste through the building at the direction of the Engineer at times designated by the Owner. Use sealed carts.
- D. During the transport of Asbestos Waste, on or across public thoroughfares, employ a hauler bearing all required permits for the hauling of asbestos. The haulers shall carry insurance in the same types and amounts as the Contractor. In addition, the hauler shall carry "Sudden and Accidental Pollution Liability Insurance in an amount not less than \$1,000,000.
- E. Dispose of Asbestos Waste at approved landfill bearing all appropriate licenses and permits for asbestos disposal and operated in compliance with all applicable rules and regulations. The Landfill used shall be dedicated for asbestos materials only and shall not accept any other hazardous substances.
- F. Within thirty (30) days of removal from the premises, the Contractor shall provide the Owner with disposal certificate(s) from the approved waste disposal site. Final payment will not be approved until all disposal certificates have been provided.

3.08 Clean-up Procedures

- A. Daily, during abatement activities:
 - 1. Clean-up visible accumulations of loose Asbestos Waste whenever a sufficient amount of Asbestos Containing Material to fill a single asbestos waste bag has been removed. Removal all waste materials from the Work Zone at the end of each work shift. Maintain visible material wet until after clean up.
 - 2. Place visible accumulations of Asbestos Waste in containers utilizing non-metallic dust pans and non-metallic squeegees or vacuums.

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3. Do not use metal shovels.
 4. Wet clean and vacuum all surfaces of the Work Zone on a daily basis.
 5. Upon completion of waste removal, wet clean the WDES twice. When the PDES Shower Room alternates as a Washroom, wash the Shower Room immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.
 6. Wet clean and vacuum the WDES as appropriate, as a minimum after each shift change and meal break.
 7. If excess water accumulates in the Work Zone, stop Work until the water is collected and disposed of properly.
 8. If Asbestos Waste is spilled in an elevator shaft:
 - a. Immediately evacuate, shut down and isolate all of the elevators in the affected elevator bank.
 - b. Place all spilled visible accumulations of Asbestos Waste in clean and unused containers.
 - c. Vacuum and wet clean all of the contaminated surfaces in the elevator car and shaft in repetitive cycles until clearance air levels are achieved in the car and at each terminus of the shaft.
- B. Final Clearance, The Work Zone will be considered acceptable when it has passed both visual inspections and air testing performed by the Engineer according to the criteria and sequence below:
1. In order to pass each of the visual inspections, the Work Zone and adjacent areas shall be free of all visually apparent asbestos. Any disputes over the results of any visual inspection shall be resolved by the Contractor submitting the results of bulk sample analysis demonstrating the contents of the material in question. Remove all Asbestos materials and all asbestos contaminated materials; non-asbestos materials may remain. The laboratory performing such analyses shall be a regular participant in the ELAP Quality Assurance Program for bulk sample analyses with performance results satisfactory to the Engineer. The Engineer reserves the right to independently verify the bulk results.
 2. If the Work Zone is not suitable for acceptance for any reason, promptly perform the Work requested by the Engineer.
 3. Keep each Work Zone isolated and posted with ASBESTOS CAUTION and CAUTION KEEP OUT signs until after acceptance.
 4. Typical acceptance sequence shall be as follows:
 - a. After removal of visible accumulations of Asbestos Waste, vacuum all surfaces;
 - b. Remove all bagged materials from the Work Site;

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- c. Wet clean and vacuum all objects and surfaces in the Work Zone;
- d. Visual inspection by the Engineer;
- e. Encapsulate all plastic within the Work Zone limits, do not encapsulate surfaces from which asbestos was removed;
- f. Remove, bag, and remove from the Work Site the first layer of plastic;
- g. Vacate the Work Zone for four (4) hours;
- h. Wet clean and vacuum all objects and surfaces in the Work Zone for a second time;
- i. Visual inspection by the Engineer;
- j. Vacate the Work Zone for four (4) hours;
- k. Remove, bag and remove from the Work Site the second layer of plastic;
- l. Wet clean and vacuum all surfaces in the Work Zone for a third time;
- m. Vacate the Work Zone for four (4) hours;
- n. Visual inspection by Engineer to verify the absence of Asbestos Waste, dust and or debris;
- o. Clearance Air Monitoring;
Clearance air monitoring shall consist of five air samples taken inside of the work area and five air samples taken outside of the work area.
- p. Upon successful clearance air testing, encapsulate surfaces from which Asbestos was removed;
- q. Wait for encapsulant to dry;
- r. Final Acceptance will be granted provided that items a thru n have been met to the satisfaction of the Engineer;
- s. Shut down air filtration units (demobilization);
- t. Remove the isolation barriers in conjunction with the use of HEPA vacuums;
- u. After all Work and decontamination is complete, relocate and secure objects moved to temporary locations in the course of the Work to their former positions and assure that they are in working order.

- END OF PART 3 -

ENVIRONMENTAL CONSULTING AND TECHNICAL SERVICES

Limited Asbestos Survey

PROJECT #:
258.19.14

DATE:
June 22, 2020

CLIENT:
Fuller D'Angelo P.C.
45 Knollwood Road
Elmsford, NY 10523

LOCATION:
Yonkers Public School
Westchester Hills School 29
47 Croydon Road
Yonkers New York 10710

PROJECT COMPLETION DATE:
June 12, 2020



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environmental management consulting services

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LIMITED ASBESTOS SURVEY
Yonkers Public School, Westchester Hills School 29, 47 Croydon Road,
Yonkers, N.Y. 10710

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- Appendix B Company & Personnel Licenses
- Appendix C Laboratory Accreditations
- Appendix D Sample Locations

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I. INTRODUCTION

Warren & Panzer Engineers, P.C. (Warren Panzer) at the request of Fuller D'Angelo P.C. (Client), was contracted to perform a limited survey for the presence of **Asbestos Containing Materials (ACM)** at the Yonkers Public School, Westchester Hills School 29 located at 47 Croydon Road, Yonkers, NY 10710 for the Bathroom Renovation and Window and Boiler Replacement Project.

The hazardous materials inspection was conducted by licensed NYS Asbestos Inspector (See Appendix B for personnel & company licenses) on February 20, 2020 & June 12, 2020 and involved visual examinations and sampling of suspect materials that may be impacted by the window Replacement, Masonry & Site improvement project (See Appendix A for sample locations, type of materials and analytical results).

Asbestos Containing Material (ACM)

The results of the limited asbestos survey conducted on the window, convactor units inside class rooms and ventilator areas of the lower and upper floors of the Family School 32, 1 Montclair Place, Yonkers, NY, indicate there are ACMs that will be disturbed. The purpose of this investigation was to assess if building components being impacted by the planned renovations contain asbestos. During the site visit, designated areas were inspected for suspect asbestos containing materials (i.e. Window Glazing, grout, mastic, caulk, etc.) and sampled accordingly. Warren & Panzer Engineers visited the site on February 20, 2020 & June 12, 2020.

To determine the presence of asbestos, bulk samples were collected from representative suspect homogeneous areas. A total of twenty-two (22) bulk samples were collected on February 20, 2020 & eighty (80) samples were collected on June 12, 2020 and analyzed for asbestos. All bulk samples were analyzed by Polarized Light Microscopy (PLM) with dispersion staining as described by the Interim Method of the Determination of Asbestos in Bulk Insulation, Federal Register/Volume 47, No. 103/May 27, 1982. It should be noted that some ACM may not be accurately identified and/or quantified by PLM. As an example, the original fabrication of non-friable organically bound (NOB) materials, such as vinyl floor tile materials, routinely involved milling of asbestos fibers to extremely small sizes. As a result, these fibers may go undetected under the standard PLM method. Under these circumstances, ATC (10879) & ALLAB (ELAP 12118) conducted additional bulk sample analysis via Transmission Electron Microscopy (TEM), which is required under applicable State of New York regulations for a more definitive analysis of NOB materials whenever PLM results are inconclusive.

Asbestos Survey

The asbestos survey involved a visual examination and sampling of suspect materials that may be impacted by the window replacement project, Masonry & site improvement. Inspections were conducted on 2 separate occasions, inspection conducted on February 20, 2020 was limited, According to SOW was provided by client only windows were being replaced. Full set

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of drawing was received on later date and upon revision SOW was different than what was provided initially. On June 12, 2020 inspector conducted inspection as per new drawings provided by client in which window replacement, Masonry & site improvement work is being performed.

As per New York State Regulations, materials which may contain asbestos, identified as "suspect materials", were collected for this survey. Materials which are considered suspect include a wide variety of surfacing, thermal systems, insulation materials, and miscellaneous type of materials. A survey of this nature intends to identify what types and where confirmed asbestos containing materials are located, on a location by location basis. Suspect ACM's that appear similar in age, color and texture were grouped together in what are identified as "homogenous areas" and sampled accordingly. A more technical description of sampling and regulations is discussed below in Section II. This survey included the bulk sampling and collection of readily accessible materials using nondestructive sampling procedures. Inspection results are presented in Appendix A (Summary of Asbestos Bulk Sample Locations). The presence of asbestos containing materials will impact a project because all ACM will have to be abated prior to commencement of other work. Abatement will precede all other construction phases. The specification and design phase will include a more detailed description of such procedures and methods.

According to the EPA regulations, ASHARA Requirement to Public & Commercial Buildings, New York State Industrial Code 56, OSHA Regulations and NIOSH recommendations, asbestos containing materials must be removed prior to disturbance during renovation activities. A qualified, professional asbestos abatement contractor should be retained to remove the asbestos-containing materials if demolition or disturbances of the materials are likely through the renovation activities. It is recommended that specifications or a work plan for the removal of the asbestos containing materials be developed to assist in the abatement bidding as it related to the phasing of the project. In conjunction with the asbestos abatement, project air monitoring should be performed to document that proper work practices and applicable OSHA, ASHARA and EPA regulations are followed.

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II. FIELD PROCEDURES AND ANALYSIS METHODOLOGY

Analytical Method for Asbestos

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, DOC #560/5-85-024, and 40 CFR Part 763, Subpart E.

Field information was organized as per the Asbestos School Hazard Abatement Reauthorization Act (ASHERA) concept of homogenous area (HA). That is, suspect ACM's that appear similar in age, color and texture were grouped together, sampled, and assessed for condition.

For the purposes of this inspection, suspect ACM has been placed in three material categories: thermal system insulation, surfacing and miscellaneous.

Surfacing materials are those that are sprayed-on, troweled-on or otherwise applied to surfaces for fireproofing, acoustical, or decorative purposes (e.g., wall/ ceiling plaster, spray-on fireproofing, etc.).

Thermal materials are those applied to heat pipes or other structural components to prevent heat loss or gain or prevent water condensation (e.g., pipe and fitting insulation, duct insulation, boiler flue, etc.).

Miscellaneous materials are interior building materials on structural components, structural members, or fixtures, such as floor and ceiling tiles, etc. and do not include surfacing material or thermal system insulation.

Bulk samples of suspect ACM were analyzed by Polarized Light Microscopy (PLM) with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPs).

The New York State Department of Health revised the PLM Stratified Point Counting Method in 1992. The new method, "Polarized Light Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples" can be found as item 198.1 in the ELAP Certification manual.

The State of New York Environmental Laboratory Approval Program (ELAP) has determined that analysis of non-friable organically bound materials (NOB's) is not reliably performed by PLM. Therefore, if PLM yields negative results for a non-friable material, it must be confirmed by Transmission Electron Microscopy (TEM).

All samples were initially analyzed by Polarized Light Microscopy. Analysis of PLM bulk samples taken by Warren Panzer representatives was performed by WKP Laboratories located at 228

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East 45th Street, NY for analysis. WKP's laboratory is accredited by the New York State Department of Health (ELAP No.12012).

III. INSPECTION RESULTS

Asbestos (ACM) Inspection Results

February 20, 2020

Homogenous Material	Location	Material	Asbestos Content
01-01	Basement – Boiler Room, Boiler 1	Boiler Cement Patch	NAD
01-02	Basement – Boiler Room, Boiler 2	Boiler Cement Patch	NAD
01-03	Basement – Boiler Room, Boiler 2	Boiler Cement Patch	NAD
01-04	Basement – Boiler Room, Flue to Boiler 2	Boiler Cement Patch	NAD
02-05	Basement – Boiler Room, Base Of Boiler 1	Brick Mortar	NAD
02-06	Basement – Boiler Room, Base Of Boiler 2	Brick Mortar	NAD
03-07	1 st Floor – Women's Faculty Bathroom	Ceramic Floor Tile Grout (Configured Tile Shape)	NAD
03-08	1 st Floor – Women's Faculty Bathroom	Ceramic Floor Tile Grout (Configured Tile Shape)	NAD
04-09	1 st Floor – Men's Faculty Bathroom	Ceramic Floor Tile Grout (1Sq. In. Tiles))	NAD
04-10	1 st Floor – Men's Faculty Bathroom	Ceramic Floor Tile Grout (1Sq. In. Tiles))	NAD
05-11	1 st Floor – Women's Faculty Bathroom	Ceramic Wall Tile Grout	Chrysotile less than 1%
05-12	1 st Floor – Women's Faculty Bathroom	Ceramic Wall Tile Grout	Chrysotile less than 1%
06-13	1 st Floor Boys' Bathroom	4"x4" Ceramic Wall Tile Grout	NAD
06-14	1 st Floor Girls' Bathroom	4"x4" Ceramic Wall Tile Grout	NAD
07-15	1st Floor Women's Faculty Bathroom	2'x4' Ceiling Tile	NAD
07-16	1st Floor Boys' Faculty Bathroom	2'x4' Ceiling Tile	NAD
08-17	Exterior Windows – Along Connection	Exterior Window Caulk	Chrysotile 4.3%
08-18	Exterior Windows – Outside Room 22	Exterior Window Caulk	NA/PS
08-19	Exterior Windows – Outside Room 10	Exterior Window Caulk	NA/PS
08-20	Exterior Windows – Inner Court	Exterior Window Caulk	NA/PS
09-21	Exterior Wall - Inner Court	Brick Mortar	NAD
09-22	Exterior Wall - Inner Court, Room 13	Brick Mortar	NAD

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June 12, 2020

Homogenous Material	Location	Material	Asbestos Content
1-1	Old Building -Exterior Door, By Classroom 8	Door Caulking	Chrysotile 4.6%
1-2	Old Building – Exterior Door, By Classroom 24	Door Caulking	NA/PS
1-3	Old Building – Exterior Door, By Staff Lounge	Door Caulking	NA/PS
2-4	Old Building – Exterior, Kitchen	Window Glazing	Anthophyllite 2.0%
2-5	Old Building – Exterior, Classroom 2	Window Glazing	NA/PS
2-6	Old Building – Exterior, Classroom 6	Window Glazing	NA/PS
3-7	Old Building – Exterior, By Classroom 12	Tar Above Vents	Chrysotile 20.0%
3-8	Old Building – Exterior, By Classroom 16	Tar Above Vents	NA/PS
4-9	New Building – Exterior, By Grade 1 Classroom	Tar Above Vents	NAD
4-10	New Building – Exterior, Office	Tar Above Vents	NAD
5-11	New Building – Exterior, By Special Ed. Classroom	Door Mortar	NAD
5-12	New Building – Exterior, By OT/FT	Door Mortar	NAD
6-13	New Building – Grade 3 Classroom	Window Glazing	NAD
6-14	New Building – Teacher W'S Lounge	Window Glazing	NAD
7-15	Classroom 23	Black Mastic Under 9"x9" Floor Tile	NAD
7-16	Classroom 21	Black Mastic Under 9"x9" Floor Tile	NAD
7-17	Classroom 23	Light Brown 9"x9" Floor Tile	Chrysotile 10.0%
7-18	Classroom 21	Light Brown 9"x9" Floor Tile	NA/PS
8-19	Classroom 24	Black Mastic Under 9"x9" Floor Tile	NAD
8-20	Classroom 22	Black Mastic Under 9"x9" Floor Tile	NAD
8-21	Classroom 24	Green 9"x9" Floor Tile	Chrysotile 9.5%
8-22	Classroom 22	Green 9"x9" Floor Tile	NA/PS
9-23	Classroom 20	Black Mastic Under 9"x9" Floor Tile	Chrysotile 5.0%
9-24	Classroom 18	Black Mastic Under 9"x9" Floor Tile	NA/PS
9-25	Classroom 20	Gray 9"x9" Floor Tile	NA/PS
9-26	Classroom 18	Gray 9"x9" Floor Tile	NA/PS

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Westchester Hills School 29, 47 Croydon Road,
Yonkers, N.Y. 10710*

Homogenous Material	Location	Material	Asbestos Content
10-27	Classroom 17	Red 9"x9" Floor Tile	Chrysotile 15.5%
10-28	Classroom 11	Red 9"x9" Floor Tile	NA/PS
11-29	Classroom 10	Black 9"x9" Floor Tile	Chrysotile 15.5%
11-30	Classroom 8	Black 9"x9" Floor Tile	NA/PS
12-31	Classroom 8	Slate	NAD
12-32	Classroom 13	Slate	NAD
13-33	Classroom 8	Slate Grout	NAD
13-34	Classroom 13	Slate Grout	NAD
14-35	Classroom 8	CMU Mortar	NAD
14-36	By Women's Faculty Bathroom	CMU Mortar	NAD
14-37	By Men's Faculty Bathroom	CMU Mortar	NAD
15-38	By Kitchen	Wall Plaster – White Coat	NAD
15-39	Classroom 7	Wall Plaster – White Coat	NAD
15-40	Classroom 6	Wall Plaster – White Coat	NAD
15-41	Classroom 1	Wall Plaster – White Coat	NAD
15-42	Classroom 2	Wall Plaster – White Coat	NAD
16-43	By Kitchen	Wall Plaster – Brown Coat	NAD
16-44	Classroom 7	Wall Plaster – White Coat	NAD
16-45	Classroom 6	Wall Plaster – White Coat	NAD
16-46	Classroom 1	Wall Plaster – White Coat	NAD
16-47	Classroom 2	Wall Plaster – Brown Coat	NAD
17-48	Classroom 5	Black Mastic Under 12"x12" Floor Tile	Chrysotile 2.6%
17-49	Classroom 2	Black Mastic Under 12"x12" Floor Tile	NA/PS
18-50	Classroom 5	Green 12"x12" Floor Tile	Chrysotile 17.4%
18-51	Classroom 2	Green 12"x12" Floor Tile	NA/PS
19-52	Classroom 7	White 12"x12" Floor Tile	Chrysotile 17.0%
19-53	Classroom 6	White 12"x12" Floor Tile	NA/PS
20-54	Classroom 4	Black 12"x12" Floor Tile	Chrysotile 3.1%
20-55	Classroom 3	Black 12"x12" Floor Tile	NA/PS
21-56	Classroom 6	Yellow Floor Tile	NAD
21-57	Classroom 2	Yellow Floor Tile	NAD
22-58	1 st floor – Corridor	2'x4' Ceiling Tile	NAD
22-59	1 st floor – Corridor	2'x4' Ceiling Tile	NAD
23-60	By Security Office	Pipe Canvas	NAD
23-61	By Teacher W/S	Pipe Canvas	NAD
23-62	By Kitchen	Pipe Canvas	NAD

LIMITED ASBESTOS SURVEY

Yonkers Public School, Westchester Hills School 29, 47 Croydon Road,
Yonkers, N.Y. 10710

Homogenous Material	Location	Material	Asbestos Content
24-63	By Security Office	2'x4' Ceiling Tile	NAD
24-64	By Teacher W/S	2'x4' Ceiling Tile	NAD
25-65	Classroom 20	Brown Cove Base Mastic	NAD
25-66	Dining Area	Brown Cove Base Mastic	NAD
26-67	Classroom 20	Black Cove Base	NAD
26-68	Dining Area	Black Cove Base	NAD
27-69	Women's Faculty Bathroom	Ceramic Tile Glue	Chrysotile 1.7%
27-70	Men's Faculty Bathroom	Ceramic Tile Glue	NA/PS
28-71	Girls Bathroom	Board Attached to Ceiling	NAD
28-72	Men's Faculty Bathroom	Board Attached to Ceiling	NAD
29-73	Exterior – By Classroom 12	Exterior Caulking Around Vents	NAD
29-74	Exterior – By Classroom 16	Exterior Caulking Around Vents	NAD
30-75	Dining Area	12"x12" Floor Tile Glue	NAD
30-76	Dining Area	12"x12" Floor Tile Glue	NAD
30-77	Dining Area	Gray 12"x12" Floor Tile Glue	NAD
30-78	Dining Area	Gray 12"x12" Floor Tile Glue	NAD
31-79	1 st Floor	Duct Sealant	NAD
31-80	1 st Floor	Duct Sealant	NAD

NAD: NO ASBESTOS DETECTED

NAD-NVD: NO ASBESTOS DETECTED-NO VERMICULITE DETECTED

NA/PS: NOT ANALYZED POSITIVE STOP

BOLD: ASBESTOS-CONTAINING MATERIAL

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Westchester Hills School 29, 47 Croydon Road,
Yonkers, N.Y. 10710*

IV. FINDINGS AND RECOMMENDATIONS

The results of the visual inspection and bulk sample analysis determined that the following materials are ACM:

February 19, 2020

- **Exterior Window Caulk – Exterior Windows: Along the Connection, Outside Rooms 22 and 10, and in the Inner Court.**

June 12, 2020

- **Door Caulking – Old Building, Exterior Door by Staff Lounge, Classrooms 8 and 24.**
- **Window Caulking – Old Building – Exterior: Kitchen, Classroom 2 and 6.**
- **Tar Above Vents – Old Building – Exterior: By classrooms 12 and 16.**
- **Light Brown 9"x9" Floor Tile – Classrooms 21 and 23.**
- **Green 9"x9" Floor Tile – Classrooms 22 and 24.**
- **Black Mastic Under 9"x9" Floor Tile – Classrooms 18 and 20.**
- **Red 9"x9" Floor Tile – Classrooms 11 and 17.**
- **Black 9"x9" Floor Tile – Classrooms 8 and 10.**
- **Black Mastic Under 12"x12" Floor Tile – Classrooms 2 and 5.**
- **Green 12"x12" Floor Tile – Classrooms 2 and 5.**
- **White 12"x12" Floor Tile – Classroom 6 and 7.**
- **Black 12"x12" Floor Tile – Classroom 3 and 4.**
- **Ceramic Tile Glue – Women's and Men's Faculty Bathrooms.**

We recommend abating the material that came back positive. See appendix (E) for all Asbestos Containing Material locations. There was no visible Drywall & Joint compound. Convactor units did not have any visible suspect material. There is potential of ACM pipe insulation & associated fittings in bathroom pipe chases. In old building 2 x 4 ceiling tiles attached to the deck are same as ceiling tiles and are sampled and they do not contain asbestos. In new building ceiling deck is metal.

Appendix A contains copy of the laboratory reports and chain-of-custody forms for your records.

V. CONCLUSIONS

In the event, that identified ACMs are to be disturbed by renovation work, proper asbestos abatement procedures are required to be implemented prior to the commencement of such work. All asbestos abatement work must be performed in accordance with all applicable Federal, State and Local rules and regulations. A licensed abatement contractor must perform the removal of all friable and non-friable ACM.

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Westchester Hills School 29, 47 Croydon Road,
Yonkers, N.Y. 10710*

VI. LIMITATIONS AND AREAS NOT ACCESSIBLE

Warren Panzer inspected and sampled materials, which were observable and accessible to the survey team. It is possible, however, that additional suspect materials may exist within interstitial space (i.e. underground chases, beneath pavement/asphalts pathways, etc.), which were not accessible or not made accessible and as a result not noted in this report.

If questions arise regarding asbestos in materials/locations that were not tested by Warren Panzer, then additional survey services should be procured to test these locations. Warren Panzer makes no representation or warranty concerning the standards and specifications provided in applicable regulations. Any materials that have not been tested and/or found during inspection must be assumed positive for asbestos.

We appreciate the opportunity to be of the service to Fuller D' Angelo P.C. Should you have any questions or require additional information, please contact our office.

Sincerely,

Usman Younas
Project Manager
NYS DOL Certified Asbestos Inspector / NYC DEP Certified Asbestos Investigator

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Family School 32, 1 Montclair Place, Yonkers, N.Y.
10710*

Appendix A

Laboratory Reports & Chain of Custody Forms



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client:	Warren Panzer Engineers, PC	PAGE:	1 of 5
WKP File #:	501	TURNAROUND TIME:	Standard
WKP Log I.D. #:	2000236	DATE COLLECTED:	02/20/2020
Attention:	Greg Chomenko	DATE RECEIVED:	02/24/2020
		ANALYSIS DATE:	02/24/2020
		REPORT DATE:	02/24/2020
		REVISED:	
Client Job:	258.19.14		
Charge Code:	258.19.14		
Location:	Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY	COLLECTED BY:	R. Treglio/J. Sanmartin

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s) (%)	Non-Asbestos Fibers (%)	Non-Fibrous Materials (%)
01-01	2000236-001	Boiler Cement Patch, Basement - Boiler Room, Boiler 1, Friable, Light Gray, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected	Mineral Wool 25%	Non-Fibrous Material 75%
Total % Asbestos: No Asbestos Detected					
01-02	2000236-002	Boiler Cement Patch, Basement - Boiler Room, Boiler 2, Friable, Gray, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected	Mineral Wool 12%	Non-Fibrous Material 88%
Total % Asbestos: No Asbestos Detected					
01-03	2000236-003	Boiler Cement Patch, Basement - Boiler Room, Boiler 2, Friable, Beige, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected	Mineral Wool 15%	Non-Fibrous Material 85%
Total % Asbestos: No Asbestos Detected					
01-04	2000236-004	Boiler Cement Patch, Basement - Boiler Room, Flue To Boiler 2, Friable, Gray, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected	Mineral Wool 15%	Non-Fibrous Material 85%
Total % Asbestos: No Asbestos Detected					
02-05	2000236-005	Brick Mortar, Basement - Boiler Room, Base Of Boiler 1, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos: No Asbestos Detected					
02-06	2000236-006	Brick Mortar, Basement - Boiler Room, Base Of Boiler 2, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos: No Asbestos Detected					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

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Client: Warren Panzer Engineers, PC

WKP File #: 501

WKP Log I.D. #: 2000236

Attention: Greg Chomenko

Client Job: 258.19.14

Charge Code: 258.19.14

Location: Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./
Yonkers, NY

PAGE: 2 of 5

TURNAROUND TIME: Standard

DATE COLLECTED: 02/20/2020

DATE RECEIVED: 02/24/2020

ANALYSIS DATE: 02/24/2020

REPORT DATE: 02/24/2020

REVISED:

COLLECTED BY: R. Treglio/J. Sanmartin

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
03-07	2000236-007	Ceramic Floor Tile Grout (Configured Tile Shape), 1st Floor - Women's Faculty Bathroom, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
03-08	2000236-008	Ceramic Floor Tile Grout (Configured Tile Shape), 1st Floor - Women's Faculty Bathroom, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
04-09	2000236-009	Ceramic Floor Tile Grout (1 Sq. In. Tiles), 1st Floor - Men's Faculty Bathroom, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
04-10	2000236-010	Ceramic Floor Tile Grout (1 Sq. In. Tiles), 1st Floor - Men's Faculty Bathroom, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
05-11	2000236-011	Ceramic Wall Tile Grout, 1st Floor - Women's Faculty Bathroom, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	Chrysotile	0.5%			Non-Fibrous Material	99.5%
			Total % Asbestos: <1%					
05-12	2000236-012	Ceramic Wall Tile Grout, 1st Floor - Men's Faculty Bathroom, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	Chrysotile	0.5%			Non-Fibrous Material	99.5%
			Total % Asbestos: <1%					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
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Fax: (212) 922-0630

Client:	Warren Panzer Engineers, PC	PAGE:	3 of 5
WKP File #:	501	TURNAROUND TIME:	Standard
WKP Log I.D. #:	2000236	DATE COLLECTED:	02/20/2020
Attention:	Greg Chomenko	DATE RECEIVED:	02/24/2020
		ANALYSIS DATE:	02/24/2020
		REPORT DATE:	02/24/2020
Client Job:	258.19.14	REVISED:	
Charge Code:	258.19.14		
Location:	Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY	COLLECTED BY:	R. Treglio/J. Sanmartin

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
06-13	2000236-013	4"x4" Ceramic Wall Tile Grout, 1st Floor - Boys' Bathroom, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos:		No Asbestos Detected			
06-14	2000236-014	4"x4" Ceramic Wall Tile Grout, 1st Floor - Girls' Bathroom, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos:		No Asbestos Detected			
07-15	2000236-015	2'x4' Ceiling Tile, 1st Floor - Women's Faculty Bathroom, NOB, White/Light Gray, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos:		Inconclusive			
07-16	2000236-016	2'x4' Ceiling Tile, 1st Floor - Boys' Faculty Bathroom, NOB, White/Light Gray, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos:		Inconclusive			
08-17	2000236-017	Exterior Window Caulk, Exterior Windows - Along Connection, NOB, Brown, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	4.3%			Non-Fibrous Material	95.7%
			Total % Asbestos:		4.3%			
08-18	2000236-018	Exterior Window Caulk, Exterior Windows - Outside Room 22, NOB, Brown, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos:		Not Analyzed			



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client: Warren Panzer Engineers, PC
WKP File #: 501
WKP Log I.D. #: 2000236
Attention: Greg Chomenko

Client Job: 258.19.14
Charge Code: 258.19.14
Location: Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./
Yonkers, NY

PAGE: 4 of 5
TURNAROUND TIME: Standard
DATE COLLECTED: 02/20/2020
DATE RECEIVED: 02/24/2020
ANALYSIS DATE: 02/24/2020
REPORT DATE: 02/24/2020
REVISED:
COLLECTED BY: R. Treglio/J. Sanmartin

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s) (%)	Non-Asbestos Fibers (%)	Non-Fibrous Materials (%)
08-19	2000236-019	Exterior Window Caulk, Exterior Windows - Outside Room 10, NOB, Tan, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed			
Total % Asbestos: Not Analyzed					
08-20	2000236-020	Exterior Window Caulk, Exterior Windows - Inner Court, NOB, Tan, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed			
Total % Asbestos: Not Analyzed					
09-21	2000236-021	Brick Mortar, Exterior Wall - Inner Court, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos: No Asbestos Detected					
09-22	2000236-022	Brick Mortar, Exterior Wall - Inner Court, Room 13, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos: No Asbestos Detected					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
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Client: Warren Panzer Engineers, PC
WKP File #: 501
WKP Log I.D. #: 2000236
Attention: Greg Chomenko
Client Job: 258.19.14
Charge Code: 258.19.14
Location: Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./
Yonkers, NY

PAGE: 5 of 5
TURNAROUND TIME: Standard
DATE COLLECTED: 02/20/2020
DATE RECEIVED: 02/24/2020
ANALYSIS DATE: 02/24/2020
REPORT DATE: 02/24/2020
REVISED:
COLLECTED BY: R. Treglio/J. Sanmartin

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s) (%)	Non-Asbestos Fibers (%)	Non-Fibrous Materials (%)
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ANALYSIS /
ACCREDITATIONS: Bulk sample analysis by Polarized Light Microscopy, ELAP Method 198.1 and 198.6. NYS ELAP Laboratory ID # 12012
and NVLAP Lab Code 101950-0.

- NOTES:
1. NAD denotes NO ASBESTOS DETECTED.
 2. Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
 3. The samples in this report were not collected by WKP Laboratories, Inc.
 4. This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, or any other agency of the U.S. government. The report, or certificate, shall not be reproduced, except in full, without the written approval of the laboratory.
 5. All inhomogeneous layers of the bulk sample are analyzed separately.
 6. PLM bulk samples will be disposed of after 3 months unless otherwise directed by client in writing.
 7. * Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
 8. Quality control data (Including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.
 9. NY ELAP Item 198.6 does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 10. Microscope: PLM Microscope #2: Leica DM750P, S/N: 964001380UN0025

Sean Scales
Laboratory Analyst

Sean Scales
Laboratory Director

Report Prepared by:
Sean Scales



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client: Warren Panzer Engineers, PC

WKP File #: 501

WKP Log I.D. #: 2000610

Attention: Greg Chomenko

Client Job: 258.19.14

Charge Code: 258.19.14

Location: Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/
47 Croydon Rd./ Yonkers, NY/ 1st Floor

PAGE: 1 of 14

TURNAROUND TIME: Standard

DATE COLLECTED: 06/12/2020

DATE RECEIVED: 06/15/2020

ANALYSIS DATE: 06/16/2020

REPORT DATE: 06/17/2020

REVISED:

COLLECTED BY: Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
1-1	2000610-001	Door Caulking, Old Building - Exterior Door, By Classroom 8, NOB, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	4.6%			Non-Fibrous Material	95.4%
			Total % Asbestos: 4.6%					
1-2	2000610-002	Door Caulking, Old Building - Exterior Door, By Classroom 24, NOB, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
1-3	2000610-003	Door Caulking, Old Building - Exterior Door, By Staff Lounge, NOB, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
2-4	2000610-004	Window Glazing, Old Building - Exterior, Kitchen, NOB, Light Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Anthophyllite	2.0%			Non-Fibrous Material	98.0%
			Total % Asbestos: 2.0%					
2-5	2000610-005	Window Glazing, Old Building - Exterior, Classroom 2, NOB, Light Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
2-6	2000610-006	Window Glazing, Old Building - Exterior, Classroom 6, NOB, Light Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client:	Warren Panzer Engineers, PC	PAGE:	2 of 14
WKP File #:	501	TURNAROUND TIME:	Standard
WKP Log I.D. #:	2000610	DATE COLLECTED:	06/12/2020
Attention:	Greg Chomenko	DATE RECEIVED:	06/15/2020
		ANALYSIS DATE:	06/16/2020
		REPORT DATE:	06/17/2020
Client Job:	258.19.14	REVISED:	
Charge Code:	258.19.14		
Location:	Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY/ 1st Floor	COLLECTED BY:	Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
3-7	2000610-007	Tar Above Vents, Old Building - Exterior, By Classroom 12, NOB, Black, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	20.0%			Non-Fibrous Material	80.0%
			Total % Asbestos: 20.0%					
3-8	2000610-008	Tar Above Vents, Old Building - Exterior, By Classroom 16, NOB, Black, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
4-9	2000610-009	Tar Above Vents, New Building - Exterior, By Grade 1 Classroom, NOB, Black, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos: Inconclusive					
4-10	2000610-010	Tar Above Vents, New Building - Exterior, Office, NOB, Black, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos: Inconclusive					
5-11	2000610-011	Door Mortar, New Building - Exterior, By Special Ed. Classroom, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
5-12	2000610-012	Door Mortar, New Building - Exterior, By OT/FT, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client:	Warren Panzer Engineers, PC	PAGE:	3 of 14
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Attention:	Greg Chomenko	DATE RECEIVED:	06/15/2020
		ANALYSIS DATE:	06/16/2020
		REPORT DATE:	06/17/2020
		REVISED:	
Client Job:	258.19.14		
Charge Code:	258.19.14		
Location:	Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY/ 1st Floor	COLLECTED BY:	Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
6-13	2000610-013	Window Glazing, New Building - Grade 3 Classroom, NOB, Green/Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
				Total % Asbestos: Inconclusive				
6-14	2000610-014	Window Glazing, New Building - Teacher W/S Lounge, NOB, Green/Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
				Total % Asbestos: Inconclusive				
7-15	2000610-015	Black Mastic Under 9"x9" Floor Tile, Classroom 23, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
				Total % Asbestos: Inconclusive				
7-16	2000610-016	Black Mastic Under 9"x9" Floor Tile, Classroom 21, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
				Total % Asbestos: Inconclusive				
7-17	2000610-017	Light Brown 9"x9" Floor Tile, Classroom 23, NOB, Light Brown, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	10.0%			Non-Fibrous Material	90.0%
				Total % Asbestos: 10.0%				
7-18	2000610-018	Light Brown 9"x9" Floor Tile, Classroom 21, NOB, Light Brown, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
				Total % Asbestos: Not Analyzed				



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Client: Warren Panzer Engineers, PC

WKP File #: 501

WKP Log I.D. #: 2000610

Attention: Greg Chomenko

Client Job: 258.19.14

Charge Code: 258.19.14

Location: Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/ 47
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REVISED:

COLLECTED BY: Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
8-19	2000610-019	Black Mastic Under Green 9"x9" Floor Tile, Classroom 24, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:				Inconclusive				
8-20	2000610-020	Black Mastic Under Green 9"x9" Floor Tile, Classroom 22, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:				Inconclusive				
8-21	2000610-021	Green 9"x9" Floor Tile, Classroom 24, NOB, Green, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	9.5%			Non-Fibrous Material	90.5%
Total % Asbestos:				9.5%				
8-22	2000610-022	Green 9"x9" Floor Tile, Classroom 22, NOB, Green, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
Total % Asbestos:				Not Analyzed				
9-23	2000610-023	Black Mastic Under 9"x9" Floor Tile, Classroom 20, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	5.0%			Non-Fibrous Material	95.0%
Total % Asbestos:				5.0%				
9-24	2000610-024	Black Mastic Under 9"x9" Floor Tile, Classroom 18, NOB, Black, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
Total % Asbestos:				Not Analyzed				



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Location: Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/
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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
9-25	2000610-025	Gray 9"x9" Floor Tile, Classroom 20, NOB, Gray, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
9-26	2000610-026	Gray 9"x9" Floor Tile, Classroom 18, NOB, Gray, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
10-27	2000610-027	Red 9"x9" Floor Tile, Classroom 17, NOB, Red, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	15.5%			Non-Fibrous Material	84.5%
			Total % Asbestos: 15.5%					
10-28	2000610-028	Red 9"x9" Floor Tile, Classroom 11, NOB, Red, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					
11-29	2000610-029	Black 9"x9" Floor Tile, Classroom 10, NOB, Black, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	15.5%			Non-Fibrous Material	84.5%
			Total % Asbestos: 15.5%					
11-30	2000610-030	Black 9"x9" Floor Tile, Classroom 8, NOB, Black, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					



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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s) (%)	Non-Asbestos Fibers (%)	Non-Fibrous Materials (%)
12-31	2000610-031	Slate, Classroom 8, Friable, Black, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
12-32	2000610-032	Slate, Classroom 13, Friable, Black, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
13-33	2000610-033	Slate Grout, Classroom 8, Friable, Light Gray, Non-homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
13-34	2000610-034	Slate Grout, Classroom 13, Friable, Light Gray, Non-homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
14-35	2000610-035	CMU Mortar, Classroom 8, Friable, Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
14-36	2000610-036	CMU Mortar, By Women's Faculty Bathroom, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
14-37	2000610-037	CMU Mortar, Friable, Gray, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		



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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s) (%)	Non-Asbestos Fibers (%)	Non-Fibrous Materials (%)
15-38	2000610-038	Wall Plaster - White Coat, By Kitchen, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
15-39	2000610-039	Wall Plaster - White Coat, Classroom 7, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
15-40	2000610-040	Wall Plaster - White Coat, Classroom 6, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
15-41	2000610-041	Wall Plaster - White Coat, Classroom 1, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
15-42	2000610-042	Wall Plaster - White Coat, Classroom 2, Friable, White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		
16-43	2000610-043	Wall Plaster - Brown Coat, By Kitchen, Friable, Tan, Non-homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Non-Fibrous Material 100%
Total % Asbestos:			No Asbestos Detected		



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Client: Warren Panzer Engineers, PC

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Attention: Greg Chomenko

Client Job: 258.19.14

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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
16-44	2000610-044	Wall Plaster - Brown Coat, Classroom 7, Friable, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
16-45	2000610-045	Wall Plaster - Brown Coat, Classroom 6, Friable, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
16-46	2000610-046	Wall Plaster - Brown Coat, Classroom 1, Friable, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
16-47	2000610-047	Wall Plaster - Brown Coat, Classroom 2, Friable, Tan, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected				Non-Fibrous Material	100%
			Total % Asbestos: No Asbestos Detected					
17-48	2000610-048	Black Mastic Under 12"x12" Floor Tile, Classroom 5, NOB, Black, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	2.6%			Non-Fibrous Material	97.4%
			Total % Asbestos: 2.6%					
17-49	2000610-049	Black Mastic Under 12"x12" Floor Tile, Classroom 2, NOB, Black, Non- homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos: Not Analyzed					



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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
18-50	2000610-050	Green 12"x12" Floor Tile, Classroom 5, NOB, Green, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	17.4%			Non-Fibrous Material	82.6%
				Total % Asbestos: 17.4%				
18-51	2000610-051	Green 12"x12" Floor Tile, Classroom 2, NOB, Green, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
				Total % Asbestos: Not Analyzed				
19-52	2000610-052	White 12"x12" Floor Tile, Classroom 7, NOB, Gray, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	17.0%			Non-Fibrous Material	83.0%
				Total % Asbestos: 17.0%				
19-53	2000610-053	White 12"x12" Floor Tile, Classroom 6, NOB, Gray, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
				Total % Asbestos: Not Analyzed				
20-54	2000610-054	Black 12"x12" Floor Tile, Classroom 4, NOB, Black, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	3.1%			Non-Fibrous Material	96.9%
				Total % Asbestos: 3.1%				
20-55	2000610-055	Black 12"x12" Floor Tile, Classroom 3, NOB, Black, Homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
				Total % Asbestos: Not Analyzed				



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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
21-56	2000610-056	Yellow Floor Tile Glue, Classroom 6, NOB, Yellow, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
21-57	2000610-057	Yellow Floor Tile Glue, Classroom 2, NOB, Yellow, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
22-58	2000610-058	2'x4' Ceiling Tile, 1st Floor - Corridor, NOB, Tan, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
22-59	2000610-059	2'x4' Ceiling Tile, 1st Floor - Corridor, NOB, Tan, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
23-60	2000610-060	Pipe Canvas, By Security Office, Friable, White/Silver/Yellow, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Cellulose Fiber Fibrous Glass	55% 20%	Non-Fibrous Material	25%
Total % Asbestos:			No Asbestos Detected					
23-61	2000610-061	Pipe Canvas, By Teacher W/S, Friable, White/Silver/Yellow, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Cellulose Fiber Fibrous Glass	55% 20%	Non-Fibrous Material	25%
Total % Asbestos:			No Asbestos Detected					



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SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
23-62	2000610-062	Pipe Canvas, By Kitchen, Friable, White/Silver/Yellow, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Cellulose Fiber Fibrous Glass	55% 20%	Non-Fibrous Material	25%
Total % Asbestos:			No Asbestos Detected					
24-63	2000610-063	2'x4' Ceiling Tile, By Security Office, NOB, Light Gray/Light Brown, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
24-64	2000610-064	2'x4' Ceiling Tile, By Teacher W/S, NOB, Light Gray/Light Brown, Non-homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
25-65	2000610-065	Brown Cove Base Mastic, Classroom 20, NOB, Dark Brown, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
25-66	2000610-066	Brown Cove Base Mastic, Dining Area, NOB, Dark Brown, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
26-67	2000610-067	Black Cove Base, Classroom 20, NOB, Black, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					



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Location:	Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY/ 1st Floor	COLLECTED BY:	Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
26-68	2000610-068	Black Cove Base, Dining Area, NOB, Black, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos:		Inconclusive			
27-69	2000610-069	Ceramic Tile Glue, Women's Faculty Bathroom, NOB, Light Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6.	Chrysotile	1.7%			Non-Fibrous Material	98.3%
			Total % Asbestos:		1.7%			
27-70	2000610-070	Ceramic Tile Glue, Men's Faculty Bathroom, NOB, Light Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. Positive Stop/Not Analyzed						
			Total % Asbestos:		Not Analyzed			
28-71	2000610-071	Board Attached To Ceiling, Girls' Bathroom, Friable, Light Brown, Homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Cellulose Fiber	100%		
			Total % Asbestos:		No Asbestos Detected			
28-72	2000610-072	Board Attached To Ceiling, Men's Faculty Bathroom, Friable, Light Brown, Homogeneous, Fibrous Note: Analyzed via PLM ELAP 198.1.	None Detected		Cellulose Fiber	100%		
			Total % Asbestos:		No Asbestos Detected			
29-73	2000610-073	Exterior Caulking Around Vents, Exterior - By Classroom 12, NOB, Light Gray, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
			Total % Asbestos:		Inconclusive			



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client:	Warren Panzer Engineers, PC	PAGE:	13 of 14
WKP File #:	501	TURNAROUND TIME:	Standard
WKP Log I.D. #:	2000610	DATE COLLECTED:	06/12/2020
Attention:	Greg Chomenko	DATE RECEIVED:	06/15/2020
		ANALYSIS DATE:	06/16/2020
		REPORT DATE:	06/17/2020
		REVISED:	
Client Job:	258.19.14		
Charge Code:	258.19.14		
Location:	Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY/ 1st Floor	COLLECTED BY:	Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)

Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
29-74	2000610-074	Exterior Caulking Around Vents, Exterior - By Classroom 16, NOB, Light Gray, Homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
30-75	2000610-075	12"x12" Floor Tile Glue, Dining Area, NOB, Beige, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
30-76	2000610-076	12"x12" Floor Tile Glue, Dining Area, NOB, Beige, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
30-77	2000610-077	Gray 12"x12" Floor Tile, Dining Area, NOB, Black/Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
30-78	2000610-078	Gray 12"x12" Floor Tile, Dining Area, NOB, Black/Gray, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					
31-79	2000610-079	Duct Sealant, 1st Floor, NOB, Off-White, Non-homogeneous, Non-Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%
Total % Asbestos:			Inconclusive					



BULK SAMPLE ANALYSIS REPORT POLARIZED LIGHT MICROSCOPY

228 East 45th Street 2nd Floor
New York, NY 10017
Tel: (212) 922-0689
Fax: (212) 922-0630

Client: Warren Panzer Engineers, PC
WKP File #: 501
WKP Log I.D. #: 2000610
Attention: Greg Chomenko
Client Job: 258.19.14
Charge Code: 258.19.14
Location: Fuller & D'Angelo/ Yonkers Public Schools/ Westchester Hills School 29/
47 Croydon Rd./ Yonkers, NY/

PAGE: 14 of 14
TURNAROUND TIME: Standard
DATE COLLECTED: 06/12/2020
DATE RECEIVED: 06/15/2020
ANALYSIS DATE: 06/16/2020
REPORT DATE: 06/17/2020
REVISED:
COLLECTED BY: Usman Younas

SUMMARY OF BULK ANALYSIS BY PLM (ELAP 198.1/ 198.6)


Client #	Lab ID #	Sample Description	Asbestos Type(s)	(%)	Non-Asbestos Fibers	(%)	Non-Fibrous Materials	(%)
31-80	2000610-080	Duct Sealant, 1st Floor, NOB, Off- White, Non-homogeneous, Non- Fibrous Note: Analyzed via PLM ELAP 198.6. TEM Recommended.	None Detected	Inconclusive			Non-Fibrous Material	100%


Total % Asbestos: Inconclusive

ANALYSIS /
ACCREDITATIONS: Bulk sample analysis by Polarized Light Microscopy, ELAP Method 198.1 and 198.6. NYS ELAP Laboratory ID # 12012
and NVLAP Lab Code 101950-0.

NOTES:

1. NAD denotes NO ASBESTOS DETECTED.
2. Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
3. The samples in this report were not collected by WKP Laboratories, Inc.
4. This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, or any other agency of the U.S. government. The report, or certificate, shall not be reproduced, except in full, without the written approval of the laboratory.
5. All inhomogeneous layers of the bulk sample are analyzed separately.
6. PLM bulk samples will be disposed of after 3 months unless otherwise directed by client in writing.
7. * Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
8. Quality control data (Including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.
9. NY ELAP Item 198.6 does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
10. Microscope: PLM Microscope #2: Leica DM750P, S/N: 964001380UN0025


Sean Scales
Laboratory Analyst


Sean Scales
Laboratory Director

Report Prepared by:
Sean Scales



Asbestos Analysis of Bulk Material

Test Method: TEM NYS 198.4 NOB

228 E. 45th St. - 2nd Fl.

New York, NY 10017

Tel.: (212) 922-0689

E-mail: sscales@wkp laboratories.com

CLIENT: Warren Panzer Engineers, PC

WKP LOG ID #: 2000236

ATTENTION: Greg Chomenko

CLIENT JOB #: 258.19.14

LOCATION: Yonkers Public Schools/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY

DATE COLLECTED: 2/20/2020

RECEIVED DATE: 2/25/2020

ANALYSIS DATE: 2/25/2020

REPORT DATE: 2/25/2020

COLLECTED BY: R. Treglio/J. Sanmartin

ANALYSIS SUMMARY OF BULK MATERIALS

WKP Lab ID #	Client Sample #	Sample Location/Description	% Asbestos and Type
2000236-015	07-15	2'x4' Ceiling Tile, 1st Floor - Women's Faculty Bathroom	None Detected
2000236-016	07-16	2'x4' Ceiling Tile, 1st Floor - Boys' Faculty Bathroom	None Detected

Accreditations: This report contains TEM data that was produced under subcontract by ALAC, NYS-ELAP #11605 (via ATC, NYS-ELAP #10879)

Notes: 1) NAD denotes "NO ASBESTOS DETECTED" / Inconclusive. N/A - Not Analyzed. 2) The samples in this report were not collected by WKP Laboratories, Inc. Therefore, bears no responsibility for sample collection activities or analytical method limitations. 3) This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, or any other agency of the U.S. government. 4) The report, or certificate, shall not be reproduced, except in full, without the written approval of WKP Laboratories, Inc. 5) All non-homogeneous layers of the bulk sample are analyzed separately. 6) PLM bulk samples will be disposed of after 3 months unless otherwise directed by client in writing. 7) PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. 8) Quality control data is available upon request.


Sean Scales
Laboratory Director

TEM NOB SAMPLE ANALYSIS REPORT

CLIENT: WKP Laboratories, INC.

ALLAB project: 200617-8

BUILDING ADDRESS: 258.19.15

Project ID: 2000609

Client Sample ID#	HA No.	SAMPLE DESCRIPTION	SAMPLE LOCATION	LAB ID#	ANALYTICAL METHOD	GRAVIMETRIC			TEM RESULT
						Organic, %	Non-organic, %	CACO3 %	
01	01	Glazing		200617-8-1	198.4	11.29	2.70	86.01	NAD
03	02	Glazing		200617-8-2	198.4	6.11	0.62	93.27	NAD
04	03	Glazing		200617-8-3	198.4	7.19	0.69	92.12	NAD
07	04	Glue		200617-8-4	198.4	76.34	13.07	10.59	NAD
08	04	Glue		200617-8-5	198.4	30.23	10.52	59.25	NAD
09	04	Floor Tile		200617-8-6	198.4	21.82	3.18	75.00	NAD
10	04	Floor Tile		200617-8-7	198.4	21.29	11.57	67.14	NAD
11	04	Floor Tile		200617-8-8	198.4	21.22	18.46	60.33	NAD
12	04	Floor Tile		200617-8-9	198.4	21.38	22.76	55.86	NAD

Date Collected: 16-Jun-2020

Date of Analysis: 18-Jun-2020

Analyst: 
Alex Barengolts

Date Received: 17-Jun-2020

Date of Report: 18-Jun-2020

Lab Director: 
Alex Barengolts

* Analysis of samples is performed by Polarized Light Microscopy (PLM) - Point Counting Method (EPA 600/M4-82-020) ,or ELAP-198.1 for NY Friable samples

* 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. NAD or TRACE by PLM are inconclusive.

(**) In accordance with NYS DOH definitive negative results for NOB materials can only be determined by performing Transmission Electron Microscopy (TEM) ELAP Method 198.4

(*) All above mention samples only determined as NOB and must be analyzed by one of gravimetric matrix reduction methods (198.6 & 198.4)

* Not Applicable = not analyzed positive stop.ELAP PLM Method 198.1 for NY friable samples include the identification and quantitation for vermiculite.

* The results relate only to the items calibrated or tested.


* The certificate of report shall not be reproduced without the written approval of the laboratory.

* The report must not be used by the client to claim endorsement by ELAP or any other agency of the US Government.

NAD-No asbestos Detected

Samples will be stored for sixty (60) days

Page 1 of 3



ALLAB Inc.

1544 East 13th Street, Unit CE, Brooklyn, NY 11230

TEL: (718) 864-3666 EMAIL: allabcru@gmail.com

NYS DOH ELAP# 12118

TEM NOB SAMPLE ANALYSIS REPORT

CLIENT: WKP Laboratories, INC.

BUILDING ADDRESS: 258.19.15

Project ID: 2000609

ALLAB project: 200617-8

Client Sample ID#	HA No.	SAMPLE DESCRIPTION	SAMPLE LOCATION	LAB ID#	ANALYTICAL METHOD	GRAVIMETRIC			TEM RESULT
						Organic, %	Non-organic, %	CACO3 %	
35	09	Glue		200617-8-10	198.4	37.29	18.64	44.07	NAD
36	09	Glue		200617-8-11	198.4	59.38	8.86	31.76	NAD
37	09	Floor Tile		200617-8-12	198.4	23.82	10.96	65.22	NAD
38	09	Floor Tile		200617-8-13	198.4	22.18	13.36	64.46	NAD
39	09	Floor Tile		200617-8-14	198.4	23.74	10.92	65.33	NAD
40	09	Floor Tile		200617-8-15	198.4	23.09	4.60	72.31	NAD
41	10	Ceiling Tile		200617-8-16	198.4	25.05	20.58	54.37	NAD
42	10	Ceiling Tile		200617-8-17	198.4	22.10	17.96	59.94	NAD
47	13	Glue		200617-8-18	198.4	49.14	5.95	44.91	NAD

Date Collected: 16-Jun-2020

Date of Analysis: 18-Jun-2020

Analyst: A. Barengolts
Alex Barengolts

Date Received: 17-Jun-2020

Date of Report: 18-Jun-2020

Lab Director: A. Barengolts
Alex Barengolts

* Analysis of samples is performed by Polarized Light Microscopy (PLM) - Point Counting Method (EPA 600/M4-82-020) ,or ELAP-198.1 for NY Friable samples

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NAD-No asbestos Detected

Samples will be stored for sixty (60) days

TEM NOB SAMPLE ANALYSIS REPORT

CLIENT: WKP Laboratories, INC.

ALLAB project: 200617-8

BUILDING ADDRESS: 258.19.15

Project ID: 2000609

Client Sample ID#	HA No.	SAMPLE DESCRIPTION	SAMPLE LOCATION	LAB ID#	ANALYTICAL METHOD	GRAVIMETRIC			TEM RESULT
						Organic, %	Non-organic, %	CACO3 %	
48	13	Glue		200617-8-19	198.4	63.64	7.27	29.09	NAD
49	13	Floor Tile		200617-8-20	198.4	20.49	4.57	74.94	NAD
50	13	Floor Tile		200617-8-21	198.4	18.35	12.15	69.50	NAD

Date Collected: 16-Jun-2020

Date of Analysis: 18-Jun-2020

Analyst: A. Barengolts
Alex Barengolts

Date Received: 17-Jun-2020

Date of Report: 18-Jun-2020

Lab Director: A. Barengolts
Alex Barengolts

* Analysis of samples is performed by Polarized Light Microscopy (PLM) - Point Counting Method (EPA 600/M4-82-020) ,or ELAP-198.1 for NY Friable samples

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(**) In accordance with NYS DOH definitive negative results for NOB materials can only be determined by performing Transmission Electron Microscopy (TEM) ELAP Method 198.4

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* Not Applicable = not analyzed positive stop.ELAP PLM Method 198.1 for NY friable samples include the identification and quantitation for vermiculite.

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* The report must not be used by the client to claim endorsement by ELAP or any other agency of the US Government.

NAD-No asbestos Detected

Samples will be stored for sixty (60) days

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

Client Name: 2000236 Fuller & D'Angelo

Property Address: Yonkers PS 29

Survey Location: 47 Croydon Rd, Yonkers, NY

W&P file #: 258.19.14

Page 1 of 2

- ☐ PLM -EPA 600/M4/82/020
☐ PLM NOB -NYS 198.1/198.6
☐ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time:

RUSH

24hr

48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
5 ft ²	Damage	01-01	Basmt Boiler Rm Boiler 1	Boiler Cement Patch				
↓	↓	02	Boiler 2	↓				
↓	↓	03	Boiler 2	↓				
10 ft ²	Fair	04	Flu to Boiler 2	↓				
		02-05	Basement Boiler Rm Base of Boiler 1	Brick Mortar				
		06	Base of Boiler 2	↓				
		03-07	1st Floor - Women Faculty Bathroom	Ceramic Floor Tile Grout (Configured Tile Shape)				
		08	↓	↓				
		04-09	1st Fl - Men Faculty Bathroom	Ceramic Floor Tile Grout (1 Squinch tiles)				
		10	↓	↓				
		05-11	1st Fl - Woman Faculty Bathroom	Ceramic Wall Tile Grout				

Sampled By: R. Treglio & J. Sammartino Date: 2/20/20

Signature: A Z.

Time: _____

Received By: Sarah Asl

Signature: SA

Date: 2/24/2020

Time: 12:00 PM

Relinquished By: R. Treglio

Date: 2/24/20

Signature: A Z.

Time: _____

Analyzed By: Sean J Scales

Signature: Sean J Scales

Date: 02/24/20

Time: 4:00 PM

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor
 Phone: (212) 922-0077
 New York, NY 10017
 Fax: (212) 922-0630

2000236

Page 2 of 2

Client Name: Fuller & D'Angelo
 Property Address: Yonkers PS 29
 Survey Location: 42 Croydon Rd, Yonkers
 W&P file #: 258.19.14

- ☐ PLM -EPA 600/M4/82/020
☐ PLM NOB -NYS 198.1/198.6
☐ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time:

RUSH

24hr

48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
		05-12	1 st Fl - Men Faculty Bathroom	Ceramic Wall Tile Grout				
		06-13	1 st Fl - Boys Bathroom	Ceramic Wall Tile Grout (4x4)				
		14	↓ - Girls Bathroom	↓				
		07-15	1 st Fl - Woman Faculty Bathroom	Ceiling Tile (2'x4')				
		16	↓ - Boys Bathroom	↓				
		08-17	Exterior Windows Along Connection	Exterior Window Caulk				
		18	↓ outside Rm 22	↓				
		19	↓ outside Rm 10	↓				
		20	↓ inner Court	↓				
		09-21	Exterior Wall Inner Court	Brick Mortar				
		22	↓ Inner Court - Rm 13	↓				

Sampled By: R. Treglio & S. Sanmartino Date: 2/20/20

Signature: [Signature]

Time: _____

Received By: Sand Asif

Signature: [Signature]

Date: 2/24/2020

Time: 12:00 PM

Relinquished By: R. Treglio

Date: 2/24/20

Signature: [Signature]

Time: _____

Analyzed By: Sean J Scales

Signature: [Signature]

Date: 02/24/20

Time: 4:00 PM

2000610

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

Page 1 of 8Client Name: Fuller & D'AngeloProperty Address: 47 CROYDEN ROAD B29Survey Location: 2nd FloorW&P file #: 258-19-14☒ PLM -EPA 600/M4/82/020☒ PLM NOB -NYS 198.1/198.6☒ TEM NOB -NYS 198.4**BULK SAMPLE - CHAIN-OF-CUSTODY FORM**

COMMENTS:

Turnaround time: **RUSH****24hr** 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
250 LF	Good	1-1	Exterior Door B/CR 8	Door caulking (OLD BLDG)				
↓	↓	1-2	↓	↓				
↓	↓	1-3	↓ ↓ BY ²⁴ stall lounge	↓				
8000 LF		2-4	Exterior kitchen	window glazing				
↓	↓	2-5	↓ CR 2	↓				
↓	↓	2-6	↓ CR 6	↓				
100 SF		3-7	Exterior BY CR 12	TAR ABOVE VENTS				
↓	↓	3-8	↓ ↓ 16	↓				
100 SF		4-9	BY grade CR	(NEW BLDG)				
↓	↓	4-10	↓ office	↓				

Sampled By: USMAN YOUNASDate: 6/12/20Received By: Saad AGFDate: 6/15/20Signature: USMAN YOUNASTime: 7AMSignature: [Signature]Time: 1:30 PMRelinquished By: USMAN YOUNASDate: 6/15/20Analyzed By: Sean J ScalesDate: 06/16/20Signature: USMAN YOUNASTime: 2 PMSignature: [Signature]Time: 10:45 AM

2000616

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

Page 2 of 8Client Name: Fuller & DangeloProperty Address: 47 CHRYSTEN ROAD PS 29Survey Location: 1st FloorW&P file #: 258.19.14☒ PLM -EPA 600/M4/82/020☒ PLM NOB -NYS 198.1/198.6☒ TEM NOB -NYS 198.4**BULK SAMPLE - CHAIN-OF-CUSTODY FORM**COMMENTS: CR = Class Roomw/s workshopTurnaround time: **RUSH****24hr**

48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
700 SF	Good	5-11	Exterior BY ^{special} ED CR	Door Mortar NEW BLDG				
↓		5-12	↓ BY OT/FT	↓				
800 LF		6-13	Grade 3 CR	Window Glazing				
↓		6-14	Teacher w/s Lounge	↓				
2100 SF		7-15	CR 23	Black Mastic UNDER 9x9 Ft	ANALYZE ONLY Mastic ONLY Tile ANALYZE Mastic only			
↓		7-16	CR 21	↓				
↓		7-17	CR 23	(Light Brown) 9x9 Floor Tile				
↓		7-18	CR 21	↓				
2100		8-19	CR 24	9x9 FL tile Mastic (Green)				
↓		8-20	CR 22					

Sampled By: USMAN YOUNASDate: 6/12/20Received By: Saad AsifDate: 6/15/20Signature: USMAN YOUNASTime: 7 AMSignature: [Signature]Time: 1:30 PMRelinquished By: USMAN YOUNASDate: 6/15/20Analyzed By: Sean J. SealesDate: 06/16/20Signature: USMAN YOUNASTime: 1 PMSignature: [Signature]Time: 10:45 AM

warrenpanzer

environmental engineering
228 East 45th Street, 2nd floor
Phone: (212) 922-0077
New York, NY 10017
Fax: (212) 922-0630

200610

Page 3 of 8

Client Name: Fuller & D'Angelo

Property Address: 47 Croydon Road PS29

Survey Location: 1st Floor

W&P file #: 258-19-14

- ☒ PLM -EPA 600/M4/82/020
☒ PLM NOB -NYS 198.1/198.6
☒ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time: **RUSH** 24hr 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)		
					PLM Friable	PLM NOB	TEM NOB
2100	Good	8-21	CR 24	(Green) 9x9 Floor tile	ANALYZE Floor tile only		
↓		8-22	CR 22	↓			
2100	↓	9-23	CR 20	Black Mastic UNDER 9x9 Floor tile	ANALYZE Mastic only		
↓		9-24	CR 18	↓			
↓		9-25	CR 20	(Gray) 9x9 Floor tile	ANALYZE Floor tile only		
↓		9-26	CR 18	↓			
2100 SF		10-27	CR 17	(Red) 9x9 Floor tile			
↓		10-28	CR 11	↓			
↓	11-29	CR 10	(Black) 9x9 Floor tile	↓			
↓	11-30	CR 8	↓				

Sampled By: <u>USMAN YOUNAS</u>	Date: <u>6/12/20</u>	Received By: <u>Saad Asif</u>	Date: <u>6/18/20</u>
Signature: <u>USMAN YOUNAS</u>	Time: <u>7AM</u>	Signature: <u>[Signature]</u>	Time: <u>1:30 PM</u>
Relinquished By: <u>USMAN YOUNAS</u>	Date: <u>6/15/20</u>	Analyzed By: <u>Sean J Scales</u>	Date: <u>06/16/20</u>
Signature: <u>USMAN YOUNAS</u>	Time: <u>1 PM</u>	Signature: <u>[Signature]</u>	Time: <u>10:45AM</u>

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

2060610

Page 4 of 8

Client Name: Fuller & D'Angelo

Property Address: 47 CLOYDON ROAD PS29

Survey Location: 2nd Floor

W&P file #: 258.19.14

☒ PLM -EPA 600/M4/82/020

☒ PLM NOB -NYS 198.1/198.6

☒ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time: RUSH 24hr 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)		
					PLM Friable	PLM NOB	TEM NOB
500 SF	Good	12-31	CR 8	slate			
↓		12-32	CR 13	↓			
50 SF		13-33	CR 8	slate Grout			
↓		13-34	CR 13	↓			
2500 SF		14-35	CR 13	CMU Mortar			
↓		14-36	BY ^{women} Faculty Bathroom	↓			
↓		14-37					
3000 SF		15-38	BY kitchen	white coat plaster wall			
↓		15-39	CR 7	↓			
↓		15-40	CR 6	↓			
↓		15-41	CR 2	↓			

Sampled By: USMAN YOUNAS

Date: 6/12/20

Received By: Saad Asif

Date: 6/15/20

Signature: USMAN YOUNAS

Time: 7AM

Signature: [Signature]

Time: 1:30 PM

Relinquished By: USMAN YOUNAS

Date: 6/15/20

Analyzed By: Sean J Scales

Date: 06/16/20

Signature: USMAN YOUNAS

Time: 1 PM

Signature: [Signature]

Time: 10:45 AM

2006/10

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

Page 5 of 8Client Name: Fuller & D'AngeloProperty Address: 47 CROFTON RD B29Survey Location: 1st FloorW&P file #: 258-19-14☐ PLM -EPA 600/M4/82/020☒ PLM NOB -NYS 198.1/198.6☒ TEM NOB -NYS 198.4**BULK SAMPLE - CHAIN-OF-CUSTODY FORM**

COMMENTS:

Turnaround time: **RUSH****24hr** 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
3000 SF	Good	15-42	CR 2	white coat plaster wall				
		16-43	BY kitchen	Brown coat plaster wall				
		16-44	CR 7					
		16-45	CR 6					
		16-46	CR 1					
		16-47	CR 2					
200 SF		17-48	CR 5	Black Mastic under 12x12 Floor tile				
		17-49	CR 2					
		18-50	CR 5	12x12 Green Floor tile				
		18-51	CR 2					

Sampled By: USMAN YOUNASDate: 6/12/20Received By: Saad ArafDate: 6/15/20Signature: USMAN YOUNASTime: 7 AMSignature: [Signature]Time: 1:30 PMRelinquished By: USMAN YOUNASDate: 6/15/20Analyzed By: Sean J ScalesDate: 06/16/20Signature: USMAN YOUNASTime: 1 PMSignature: [Signature]Time: 10:45 AM

2000610

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

Page 6 of 8

Client Name: Fuller & D'Angelo
 Property Address: 97 CROYDON RD PS29
 Survey Location: 1st Floor
 W&P file #: 258-19-14

- ☒ PLM -EPA 600/M4/82/020
☒ PLM NOB -NYS 198.1/198.6
☒ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time: **RUSH** 24hr 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)		
					PLM Friable	PLM NOB	TEM NOB
2100sf	Good	19-52	CR 7	(white) 12x12 Floor tile	(ANALYZE ONLY TILE)		
↓		19-53	CR 6	↓			
2100sf		20-54	CR 4	(Black) 12x12 Floor tile	(ANALYZE gwc ONLY)		
↓		20-55	CR 3	↓			
2100sf		21-56	CR 6	(Yellow) Floor tile glue	(ANALYZE gwc ONLY)		
↓		21-57	CR 2	↓ ↓			
2500sf		22-58	1st Floor Corridor	2x4 ceiling tile			
↓		22-59	↓	↓			
100LF		23-60	BY security office	Pipe Convey			
↓		23-61	BY teacher w/s	↓			
		23-62	BY kitchen	↓			
Sampled By: <u>USMAN YOUNAS</u>		Date: <u>6/12/20</u>		Received By: <u>Saad Isf</u>		Date: <u>6/15/20</u>	
Signature: <u>USMAN YOUNAS</u>		Time: <u>7 AM</u>		Signature: <u>[Signature]</u>		Time: <u>1:30 pm</u>	
Relinquished By: <u>USMAN YOUNAS</u>		Date: <u>6/15/20</u>		Analyzed By: <u>Sean J Scales</u>		Date: <u>06/16/20</u>	
Signature: <u>USMAN YOUNAS</u>		Time: <u>1 PM</u>		Signature: <u>[Signature]</u>		Time: <u>10:45 AM</u>	

warrenpanzer

environmental engineering

228 East 45th Street, 2nd floor

Phone: (212) 922-0077

New York, NY 10017

Fax: (212) 922-0630

2006616

Page 7 of 8

Client Name: Fuller D'Angelo

Property Address: 97 CROTON RD P/S 29

Survey Location: 2nd Floor

W&P file #: 258-19-14

☒ PLM -EPA 600/M4/82/020

☒ PLM NOB -NYS 198.1/198.6

☒ TEM NOB -NYS 198.4

BULK SAMPLE - CHAIN-OF-CUSTODY FORM

COMMENTS:

Turnaround time: **RUSH**

24hr 48hr

QTY	Condition	Sample #	Location	Material Description	RESULTS (lab use only)			
					PLM Friable	PLM NOB	TEM NOB	
500 SF	Good	24-63	BY security office	2x2 ceiling tile				
↓		24-64	BY teacher w/s	↓				
100 SF		25-65	CR 20	Covebase Mastic (Brown) (ANALYZE ONLY)				
↓		25-66	Dining area	↓ ↓				
↓		26-67	CR 20	Covebase (Black) (ANALYZE ONLY)				
↓		26-68	Dining area	↓ ↓				
100 SF		27-69	Faculty women Bathroom	Carpet tile glue				
↓		27-70	Faculty MEN ↓	↓				
500 SF		28-71	Girls Bathroom	Board ^{up} Attached to ceiling				
500 SF		28-72	Faculty MEN Bathroom	↓ ↓				

Sampled By: USMAN YOUNAS

Date: 6/12/20

Received By: Saad Araf

Date: 6/10/20

Signature: USMAN YOUNAS

Time: 7AM

Signature: [Signature]

Time: 1:30 PM

Relinquished By: USMAN YOUNAS

Date: 6/15/20

Analyzed By: Sean J Scales

Date: 06/16/20

Signature: USMAN YOUNAS

Time: 1 PM

Signature: [Signature]

Time: 10:45AM

W&P file #: 258.19.19

- ☐ PLM -EPA 600/M4/82/020
- ☒ PLM NOB -NYS 198.1/198.6
- ☐ TEM NOB -NYS 198.4

24hr 48hr

[illegible]

Time: 10:45 AM

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Family School 32, 1 Montclair Place, Yonkers, N.Y.
10710*

Appendix B

Company & Personnel Licenses

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

Warren & Panzer, Engineers, P.C.
2nd Floor
228 East 45th Street
New York, NY 10017

FILE NUMBER: 99-0641
LICENSE NUMBER: 28898
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 07/10/2019
EXPIRATION DATE: 07/31/2020

Duly Authorized Representative – Jeffrey Terhune PE:

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.

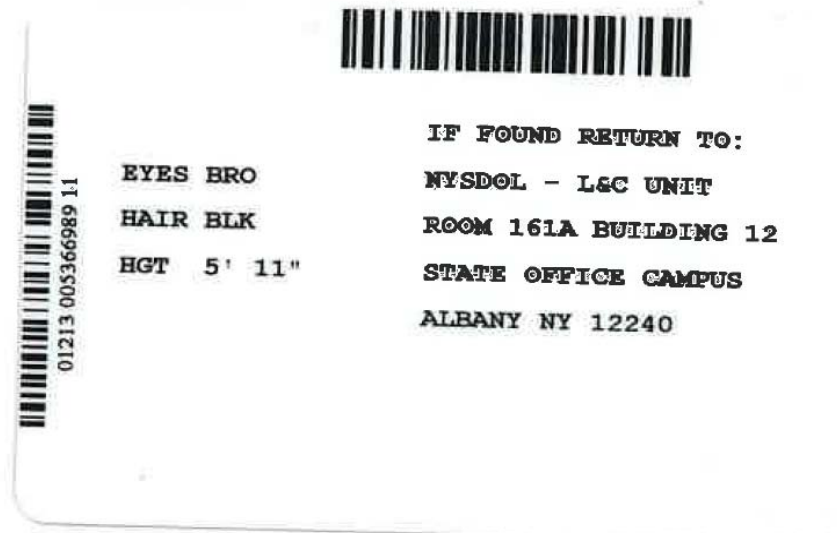
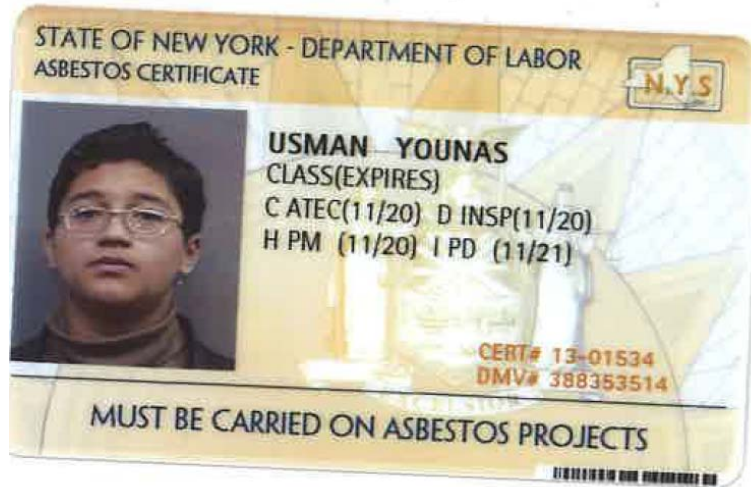


Eileen M. Franko, Director
For the Commissioner of Labor

**WARREN & PANZER ENGINEERS
NEW YORK STATE DEPARTMENT OF LABOR
ASBESTOS LICENSES**

Usman Younas

Inspector



Codes (Found on the front of the license):

A -	Asbestos Handler	F -	Operations and Maintenance
B -	Restricted Handler	I -	Allied Trades
C -	Project Air Sampling Technician	G -	Supervisor
D -	Inspector - R III	H -	Project Monitor
E -	Management Planner	I -	Project Designer

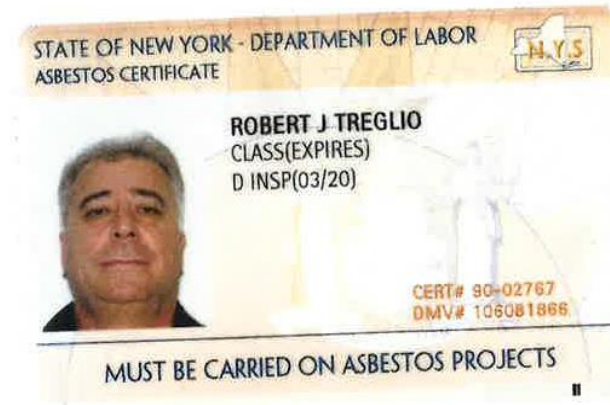
New York State Department of Labor

Asbestos License

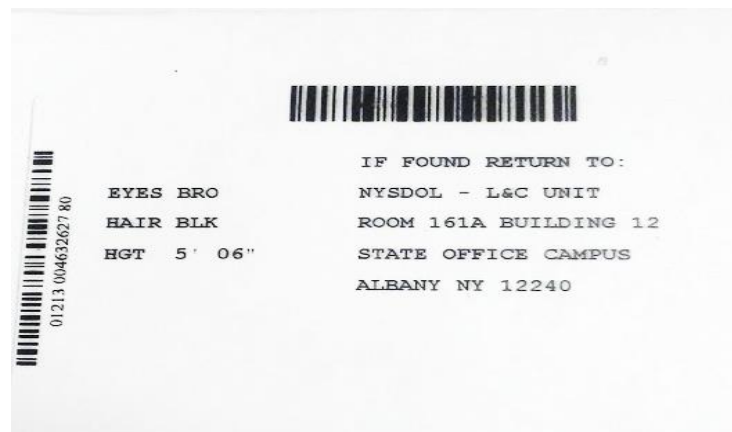
Robert J Treglio

Project Manager

Front of License



Back of License



Codes (Found on the back of the license):

- | | | |
|------------------------------------|------------------|-------------------------------|
| A- Asbestos Handler | | F- Operations and Maintenance |
| B- Restricted Handler | I- Allied Trades | G- Supervisor |
| C- Project Air Sampling Technician | | H- Project Monitor |
| D- Inspector – R III | | I- Project Designer |
| E- Management Planner | | |

LIMITED ASBESTOS SURVEY

*Yonkers Public School, Family School 32, 1 Montclair Place, Yonkers, N.Y.
10710*

Appendix C
Laboratory Accreditations

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. SEAN SCALES
WKP LABORATORIES, INC.
228 EAST 45TH ST. 2ND FLOOR
NEW YORK, NY 10017

NY Lab Id No: 12012

*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
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)



Department
of Health

Serial No.: 59970

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 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. SEAN SCALES
WKP LABORATORIES, INC.
228 EAST 45TH ST. 2ND FLOOR
NEW YORK, NY 10017

NY Lab Id No: 12012

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

Miscellaneous

Fibers

NIOSH 7400 A RULES



NEW
YORK
STATE

Department
of Health

Serial No.: 59971

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MR. SEAN SCALES
WKP LABORATORIES, INC.
228 EAST 45TH ST. 2ND FLOOR
NEW YORK, NY 10017

NY Lab Id No: 12012

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

Miscellaneous

Fibers

NIOSH 7400 A RULES

NEW
YORK
STATE

Department
of Health

Serial No.: 61683

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MR. SEAN SCALES
WKP LABORATORIES, INC.
228 EAST 45TH ST. 2ND FLOOR
NEW YORK, NY 10017

NY Lab Id No: 12012

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

Asbestos in Non-Friable Material-PLM

Item 198.6 of Manual (NOB by PLM)

NEW
YORK
STATE

Department
of Health

Serial No.: 61682

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 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

MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

is hereby **APPROVED** as an *Environmental Laboratory* in conformance with the
National Environmental Laboratory Accreditation Conference Standards (2003) for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Miscellaneous

Asbestos

EPA 100.2



Department
of Health

Serial No.: 59464

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



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 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

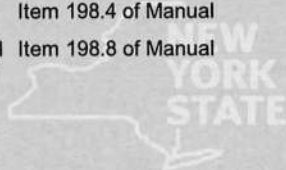
MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

*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



Department
of Health

Serial No.: 59465

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 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

MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

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

Miscellaneous

Asbestos

40 CFR 763 APX A No. III

NIOSH 7402

Fibers

NIOSH 7400 A RULES



Department
of Health

Serial No.: 59466

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards (2003) for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Miscellaneous

Asbestos

EPA 100.2



Department
of Health

Serial No.: 61221

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



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

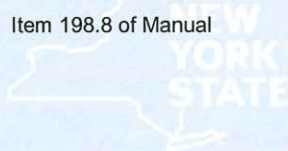
MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

*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



Department
of Health

Serial No.: 61222

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MS. MILENA BONEZZI
ATC GROUP SERVICES LLC
104 EAST 25TH STREET 8TH FLOOR
NEW YORK, NY 10010

NY Lab Id No: 10879

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

Miscellaneous

Asbestos

40 CFR 763 APX A No. III

NIOSH 7402

Fibers

NIOSH 7400 A RULES



Department
of Health

Serial No.: 61223

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 27, 2020
Revised May 20, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MR. ALEKSANDR BARENGOLTS
ALLAB INC
1544 EAST 13 STREET UNIT CA, BASEMENT
BROOKLYN, NY 11230-7281

NY Lab Id No: 12118

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

Miscellaneous

Asbestos

40 CFR 763 APX A No. III

NIOSH 7402

Fibers

NIOSH 7400 A RULES



Department
of Health

Serial No.: 62018

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

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 27, 2020
Revised May 20, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MR. ALEKSANDR BARENGOLTS
ALLAB INC
1544 EAST 13 STREET UNIT CA, BASEMENT
BROOKLYN, NY 11230-7281

NY Lab Id No: 12118

*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

NEW
YORK
STATE

Department
of Health

Serial No.: 62017

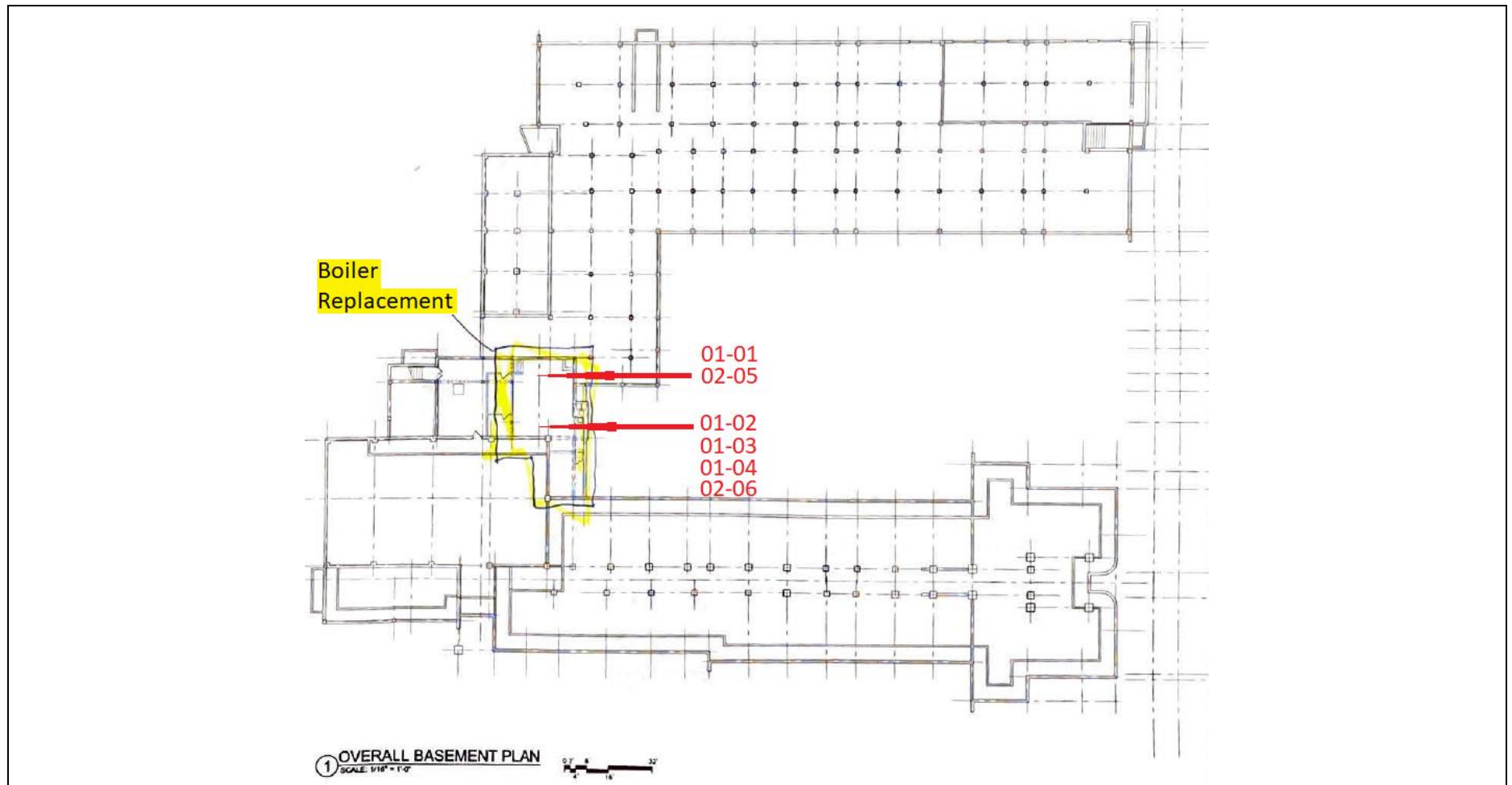
Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify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

LIMITED ASBESTOS SURVEY

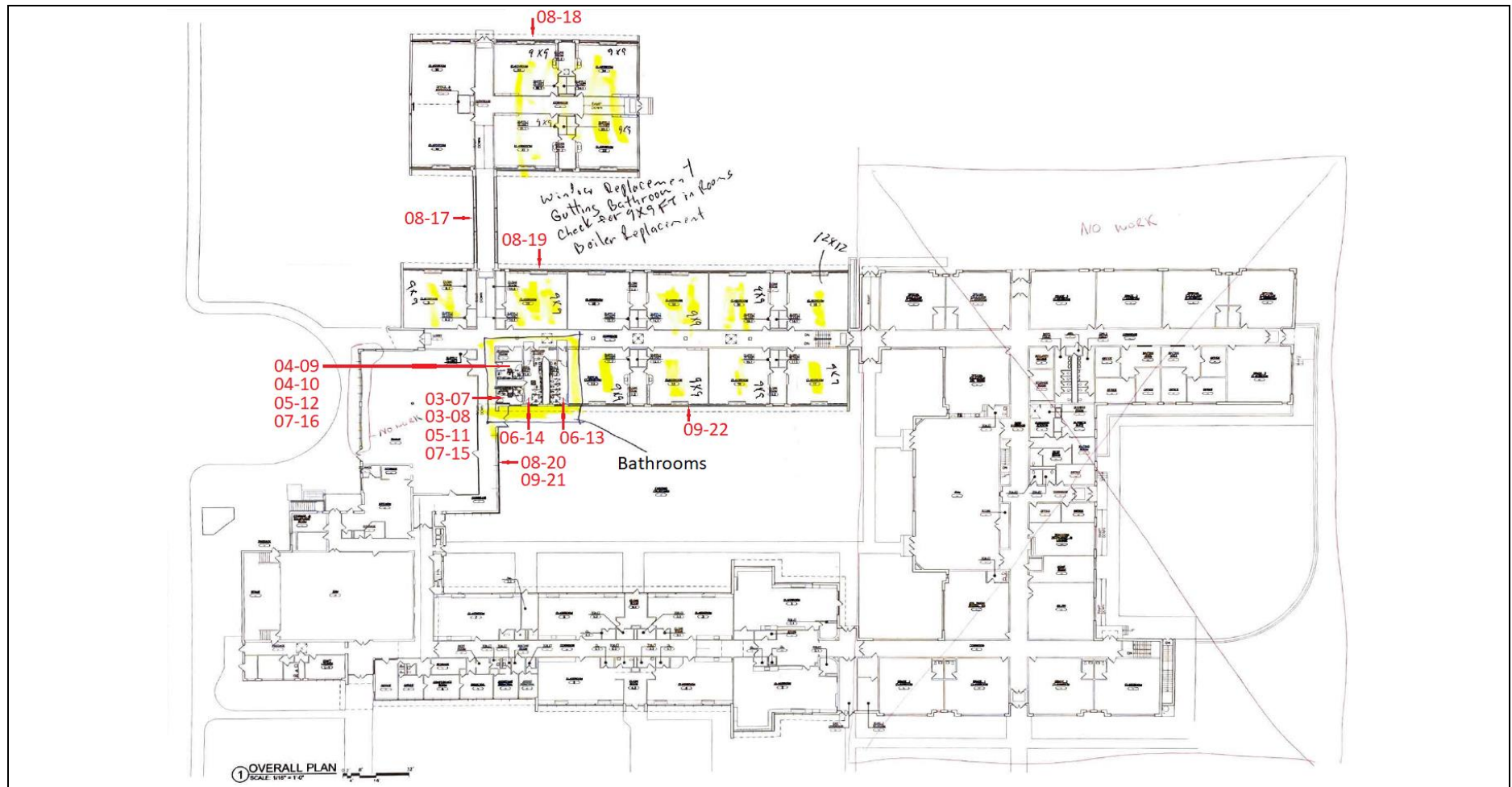
*Yonkers Public School, Family School 32, 1 Montclair Place, Yonkers, N.Y.
10710*

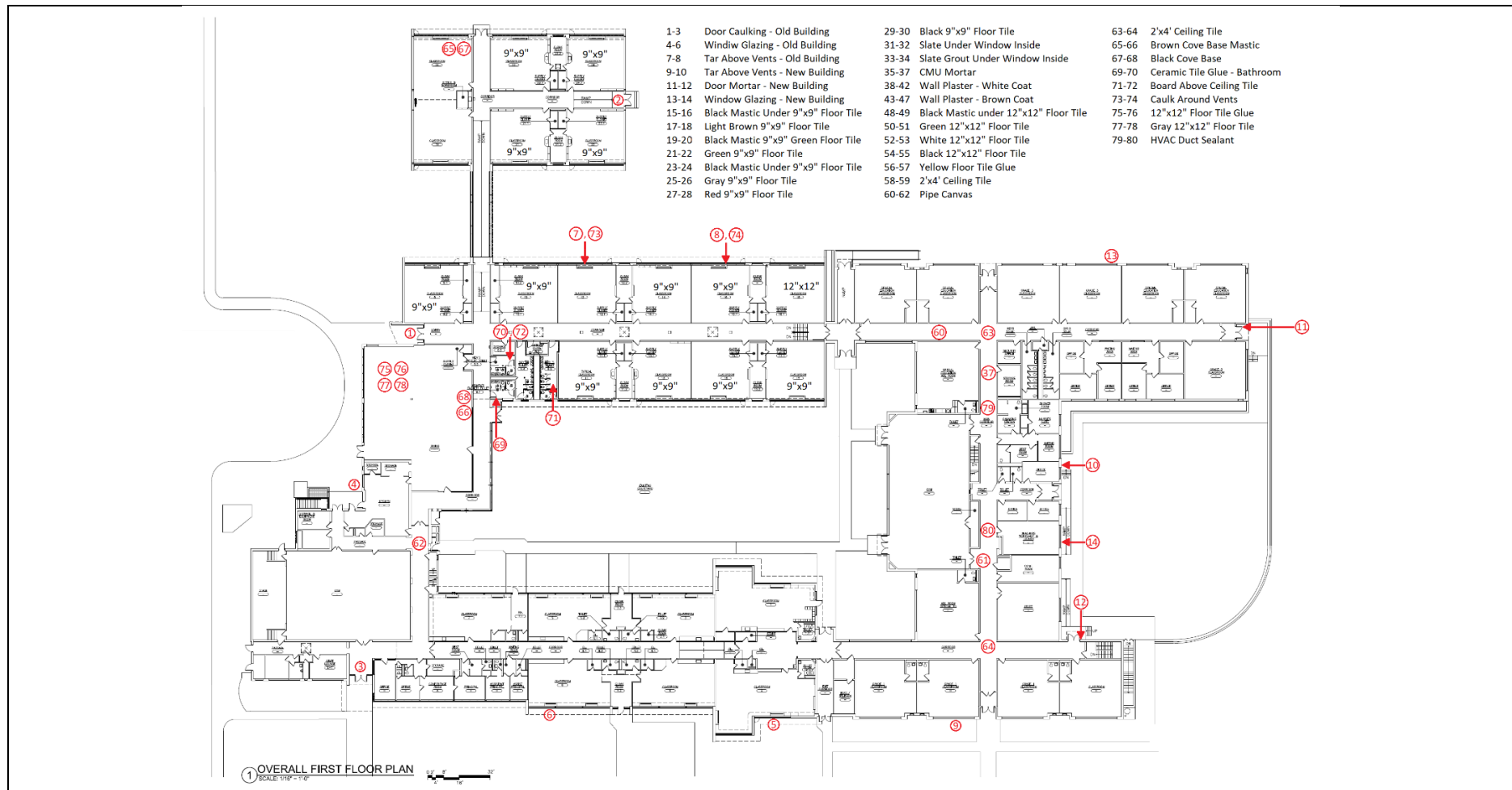
Appendix D
Sample Locations

Project Name: Limited Asbestos Survey	Project # 258.19.14
Project Location: Yonkers Public School/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY 10710	Sampling Date: February 20, 2020

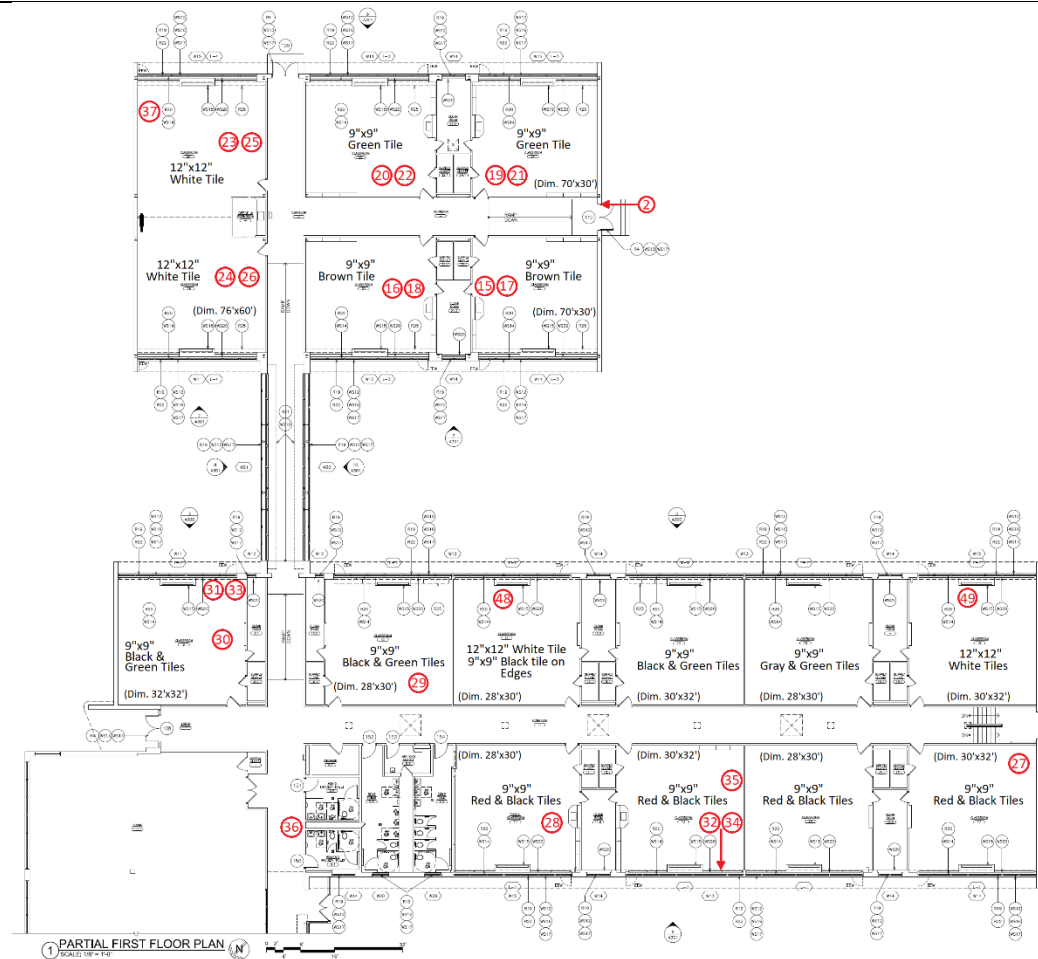
ACM Locations:

Project Name: Limited Asbestos Survey	Project # 258.19.14
Project Location: Yonkers Public School/ Westchester Hills School 29/ 47 Croydon Rd./ Yonkers, NY 10710	Sampling Date: February 20, 2020

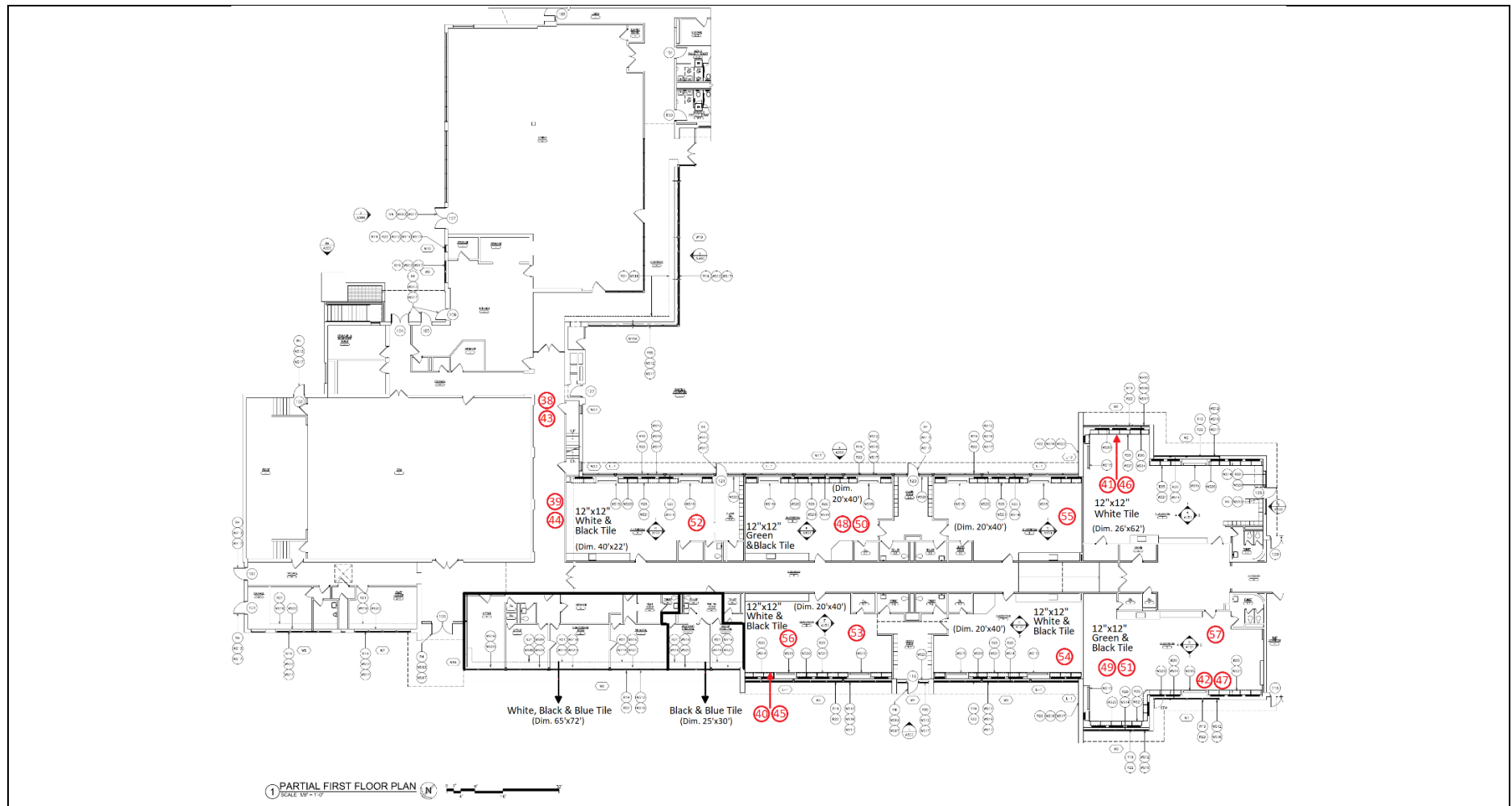


Project Name: Limited Asbestos Survey**Project #** 258.19.14**Project Location:** Yonkers Public School Westchester Hills School 29/ 47 Croydon Rd./
Yonkers, NY 10710**Sampling Date:** June 12, 2020

Project Name: Limited Asbestos Survey	Project # 258.19.14
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LIMITED ASBESTOS SURVEY

*Yonkers Public School, Family School 32, 1 Montclair Place, Yonkers, N.Y.
10710*

Appendix E
ACM Locations

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Removals.
- B. Concrete formwork.
- C. Concrete reinforcement.
- D. Joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including concrete for steel bollards and flagpole bases.
- F. Concrete curing.
- G. Abrasive metal nosing for concrete stairs.
- H. Concrete Stairs
- I. Retaining wall.
- J. Finishes.
- K. Mix design
- L. Concrete materials.
- M. Placement procedure.
- N. Field Quality Control.

1.3 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- B. Section 32 1313 - Concrete Paving and Curbs: Sidewalk and curbs.
- C. Section 31 2316 - Excavation.

1.4 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
- C. ACI 301 - Specifications for Structural Concrete; 2016.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- E. ACI 305R - Guide to Hot Weather Concreting; 2010.
- F. ACI 306R - Guide to Cold Weather Concreting; 2016.
- G. ACI 308R - Guide to External Curing of Concrete; 2016.
- H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

- I. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- J. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- K. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.
- L. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2014.
- M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- P. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- Q. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- R. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- S. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- U. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.
- V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- W. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- X. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- Y. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2015.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Require concrete supplier to provide delivery tickets for each truckload of concrete. Tickets shall be presented to and reviewed by YPS Office of Facilities Management ,Designated Representative or Testing Agency prior to discharging concrete..
 - 1. Tickets shall contain project identification name, name of Contractor, name of concrete supplier, location of batch plant, date and time of concrete batching, truck number, delivery ticket number, concrete type and class, concrete mix number, design compressive strength at 28 days, concrete mix proportions and materials, and amount of total mix design water that can be added at site prior to discharging into structure if total mix design water was not used when batched.
- B. Testing Agency will visit construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify Owner's Representative 48 hours before anticipated time of completion of reinforcement for a given section of work so they may determine if site observations are required. If site observations are required, do not place concrete until Owner's Representative or Testing Agency have had opportunity to observe reinforcement.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions for each product indicated.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
 - 1. Indicate all penetrations and sleeve location and reinforcing.
 - 2. Identify areas of exposed surfaces and finish.
- D. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- E. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
 - 3. Indicate amounts of mixing water to be withheld for later addition at Project site.
- F. Test Reports: Submit report for each test or series of tests specified.
- G. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Material Certificates: For each of the following, signed by manufacturers:
 - a. Cementitious materials.
 - b. Admixtures.
- H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.7 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Manufacturer/Supplier Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- E. Installer Qualifications: The work of this section shall be performed by a qualified installer, with a minimum of five (5) years experience, approved by the YPS Office of Facilities Management. The term "installer" used herein, shall mean a firm of established reputation which is regularly engaged in and which maintains a regular force of workmen skilled in the installation of the type of work specified in this section.
- F. Concrete Testing Service: The Owner may engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures. Contractor shall prepare cylinders in accordance with Article 3.7
- G. Delivery Records: Each delivery to the site of concrete shall be accompanied by weigh master's certification. Retain all copies for inspection by the Testing Agency.
 - 1. Indicate water added to mix a job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Store materials so as to preserve their quality and fitness for work.
- B. Store reinforcement and formwork in manner to prevent bending, damage (including damage to coatings), and accumulation of dirt.
- C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
- D. All packed materials shall be delivered to the site in original unopened containers, clearly indicating manufacturer's name, brand name, and other identifying information.

1.10 PROJECT CONDITIONS

- A. Coordinate with the work of all other sections and/or separate contracts.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Facing 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 in drawings. .
 - a. Material:
 - a) Steel
 - b) Plywood materials shall be one of the following:
 - (a) Overlaid plywood complying with U.S. Product Standards PS 1 "A-C or B-B High Density Overlaid (HDO) Concrete Form," Class 1, exterior grade or better.
 - (b) Plywood complying with U.S. Product Standard PS 1 "B-B (Concrete Form) Plywood," Class 1, exterior grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
 - 2. 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.
 - 3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings, maximum VOC of 450 g/l that will not bond with, stain, or adversely affect concrete surfaces or impair subsequent treatments of concrete surfaces requiring bond or adhesion or impede wetting of surfaces to be cured with water or curing compound.
 - 4. Form Ties: Cone snap .
 - a. Provide ties that will leave holes no larger than 1-inch diameter in concrete surface when removed.
 - b. Unexposed concrete: "Type A-3 Snap Tie Standard" by Dayton Superior or accepted equivalent.
 - c. Exposed concrete: "Type B1 Two Strut Coil Tie" or "Type B1/B3 Screw-on Coil Tie," with coil bolts and plastic cones at each end, by Dayton Superior, or accepted equivalent. Provide "Type B30 Screw-on Plastic Cone or A54 Coil Cone Concrete Plugs," by Dayton Superior, or accepted equivalent; color as selected by Architect.
 - d. Provide galvanized or stainless-steel ties for concrete elements that are reinforced with epoxy-coated or galvanized reinforcing.
 - e. Internal wood spreaders are prohibited
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

2.2 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Epoxy coated in accordance with ASTM A775/A775M, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Class A epoxy coated, deformed type, ASTM A884/A884M.
 - 1. Form: Flat Sheets.
 - 2. Mesh Size: 6 x 6.
 - 3. Wire Gage: W 6 x W6.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - a. Do not use bricks to support epoxy-coated or galvanized reinforcing
 - b. Supports for epoxy-coated reinforcing shall be either wire bar-type coated with epoxy, plastic, or vinyl compatible with concrete for a minimum distance of 2 inches from the point of contact with reinforcing or all plastic-type.
 - c. Supports for galvanized reinforcing shall be either galvanized wire bar-type or all-plastic type.
 - 3. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
 - 4. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
 - 2. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps, or other deleterious substances.
 - 3. Coarse Aggregate: Clean, uncoated, processed aggregate free from clay, mud, loam, or foreign matter.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.

2.5 ACCESSORY MATERIALS

- A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Grout: Comply with ASTM C1107/C1107M.
- B. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
 - 1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
 - a. Maximum Height Change: Plus 4 percent.
 - b. Minimum Height Change: Plus 1 percent.

- C. Abrasive Stair Nosings: Consisting of an abrasive non-slip filler bonded and locked into channels in an extruded aluminum base, alloy 6063-T6. Coefficient of friction 1.02 dry, 0.98 wet per ASTM F 609. Provide the following:
1. Tread Cast aluminum solid surface tread plate [5/16] inch thick with continuous wing anchor 1-1/4 inches deep.
 - a. 4 inches wide, lip 1/4 inch from underside.
 2. Space anchors 3" from ends.
 3. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete
 4. Product:
 - a. American Safety Tread, Style 801 "alumacast" (cast aluminum). PO Box 611, Helena, AL 35080.
 - b. Substitutions: See Section 01 25 00 Substitution Procedures..

2.6 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
1. Complying with ASTM C881/C881M and of Type required for specific application.
 2. Products:
 - a. Euclid Chemical Company: www.euclidchemical.com.
 - b. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - c. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
 - d. Substitutions: See Section 01 2500 Substitution Procedures

2.7 CURING MATERIALS

- A. Moisture-Retaining Sheet: ASTM C171.
 1. Polyethylene film, clear, minimum nominal thickness of 4 mil, 0.004 inch (0.102 mm).
- B. Membrane Curing Compound: ASTM C 309 Type 1 - Clear or translucent, Class A.
- C. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 1. For trial mixtures method, employ independent testing agency acceptable to YPS Office of Facilities Management for preparing and reporting proposed mix designs.
- C. Identify sources of all products used in design mixes.
- D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- E. Normal Weight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4000 psi.
 2. Water-Cement Ratio: Maximum 40 percent by weight.
 3. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
 4. Maximum Slump: 4 inches (100 mm).
 5. Maximum Aggregate Size: 3/4 inch (19 mm).

2.9 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.

- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347 and ACI 117.
- C. Verify that forms are clean and free of rust before applying release agent.
- D. Clean and coat forms before erection. Do not coat forms in place.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for concrete placement. Securely brace temporary openings, and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- F. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- G. 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.
- H. Fit corners and joints with gaskets or tape to prevent leakage.
- I. 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.
- J. Sleeves: Provide sleeves in concrete formwork for plumbing, electrical, and mechanical penetrations. Coordinate size and location of sleeves with Contractors and mechanical, electrical, and plumbing drawings.
 - 1. Accurately place and secure in forms.
 - 2. Coordinate sleeve locations with reinforcing bars.
- K. Penetrations shall not occur through footings, piers, columns, beams, joists, grade beams, or supported slabs unless shown in structural drawings
- L. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
- M. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement
- B. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.
- C. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

- D. Place slab reinforcing one-third of slab thickness below top surface of slab. Support reinforcement by metal chairs, runners, bolsters, or concrete brick as required.
 - 1. Dedicate workers to placement of reinforcement to continuously monitor and adjust reinforcement location during concrete placement.
- E. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- G. Comply with manufacturer-recommended procedures for installing and anchoring of doweled reinforcement using chemical adhesives, including drilling and cleaning of holes and mixing and applying of adhesives.
- H. Coordinate placement of reinforcement with openings, including sleeves and other embedded items. Where one or more bars are interrupted, provide additional reinforcement at openings. Additional reinforcement is noted in drawings.
- I. Use of nails in forms and use of clay brick to support reinforcement is prohibited.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Notify YPS Office of Facilities Management not less than 24 hours prior to commencement of placement operations.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
 - 1. Deposit and consolidate concrete in continuous operation within limits of construction joints until placing of panel or section is complete.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Uniformly slope to drains. Use darbies to smooth surface, leaving it free of humps or hollows. Do not sprinkle water or portland cement on plastic surface. Do not disturb slab surfaces before beginning finishing operations.
- E. Deposit concrete in forms in horizontal layers not deeper than 24 inches and in manner to avoid inclined construction joints.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- G. Do not use vibrators to transport concrete inside formwork.
- H. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Vibrators shall penetrate placed layer of concrete at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set.
- I. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- J. Do not allow vibrator to come in contact with form.

3.5 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

- B. Stair Nosing: Examine substrates, supports, and conditions under which this work is to be performed and notify Contractor, in writing, of conditions detrimental to the proper completion of the work
 - 1. Strictly comply with manufacturer's instructions and recommendations and approved details. Securely anchor work to substrate.
 - 2. Repair minor damage to eliminate all evidence of repair. Remove and replace work which cannot be satisfactorily repaired

3.6 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
 - 1. Preparation:
 - a. Mechanically remove loose, unsound, contaminated concrete.
 - b. Concrete must be free of materials such as paint, oil, curing compound, bond breaker, etc. that will inhibit bonding.
 - c. Thoroughly clean extraneous material such as dirt, loose chips, and dust from concrete surface. If compressed air is used, it shall be free of oil.
 - d. Concrete surface shall be dry
 - 2. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches (75 mm) and seal with waterproof tape or adhesive; secure at edges.
 - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

3.9 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to YPS Office of Facilities Management and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the YPS Office of Facilities Management. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Fuller and D'Angelo, P.C. for each individual area.

3.10 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 03 5400
CAST UNDERLAYMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Liquid-applied self-leveling floor underlayment.
 - 1. Use cementitious type at all locations.

1.3 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution: Alteration project procedures; selective removals for remodeling.
- B. Section 09 6500 - Resilient Flooring for flashing patching.
- C. Section 09 3000 - Tiling.

1.4 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- B. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars; 2018.
- C. ASTM F-2170 Relative Humidity in Concrete.
- D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- E. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Instructions.
- E. Material Test Reports: From a qualified testing agency indicating and interpreting test results of underlayments for compliance with requirements indicated.
- F. Minutes of preinstallation conference

1.6 QUALITY ASSURANCE

- A. Manufacturer: Provide underlayment manufactured by a firm with a minimum of ten (10) years experience with types equivalent to those specified.
 - 1. Manufacturer capable of providing technical training and field service representation.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years of experience who has completed work similar in material, design, and extent to that indicated for this Project and approved by the manufacturer.

- C. Testing Agency Qualifications: An independent testing agency, acceptable to YPS Office of Facilities Management and Fuller and D'Angelo, P.C., qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section 01 3000 - Administrative Requirements.
- E. Product must have a hydraulic cement-based inorganic binder content as the primary binder which includes portland cement per ASTM C150: Standard Specification for Portland Cement and other specialty hydraulic cements. Gypsum-based products are not acceptable.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products in a dry area with temperature maintained between 50° and 85°F (10° and 29°C) and protect from direct sunlight
- C. Handle products in accordance with manufacturer's printed recommendations

1.8 REGULATORY REQUIREMENTS

- A. Conform to New York State Building Codes for combustibility or flame spread requirements.

1.9 FIELD CONDITIONS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayments performance.
- C. Maintain minimum ambient temperatures of 50 degrees F (10 degrees C) 24 hours before, during and 72 hours after installation of underlayment.
- D. During the curing process, ventilate spaces to remove excess moisture.
- E. Close areas to traffic during underlayments application and, after application, for time period recommended in writing by manufacturer

1.10 WARRANTY

- A. Provide manufacturer's comprehensive ten (10) year warranty.
 - 1. Verify material is acceptable with adhesives use with finish floor systems.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cementitious Underlayment: Basis of Design:
 - 1. ARDEX Engineered Cements; ARDEX K 15 with ARDEX P51 Primer: www.ardexamericas.com.
 - 2. Substitutions: Section 01 2500 Substitution Procedures.

2.2 MATERIALS

- A. Cast Underlayments, General:
 - 1. Comply with applicable code for combustibility or flame spread requirements.
 - a. Refer to Section 01 4100 - Regulatory Requirements.
- B. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
 - 1. Compressive Strength: Minimum 5,5000 pounds per square inch (38 MPa) after 28 days, tested per ASTM C109/C109M.
 - 2. Flexural Strength: Minimum 1200 psi (8.3 MPa) after 28 days, tested per ASTM C348.
 - 3. Shrinkage: 0.025 - 0.045% @ 28 days when tested in conformance with ASTM C 531 (modified).
 - 4. Ideal Slump range 11.5" - 12.5" (2" diameter pipe, 4" high).

5. Bond Strength: 350-400 psi when tested in conformance with ASTM D 3931
 6. "0" VOC content
 7. Final Set Time: 2 to 3 hour.
 8. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch (89 mm).
 9. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
- C. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch (3 mm) in size and acceptable to underlayment manufacturer.
- D. Reinforcement: Galvanized metal lath complying with recommendations of underlayment manufacturer for specific project circumstances.
- E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.
- F. Primer: Ardex P 51
- G. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Add 7 quarts (6.6 L) of clean potable water per 55 lb. (25 kg) bag. For applications over
- C. Mix using a 1/2" (12 mm) heavy-duty drill (min. 650 rpm) with an mixing paddle. Do not over water. When mixing sanded materials, follow manufacturer's recommendations, or use a standard "gutter hook" vacuum attachment in combination with a wet/dry (Shop-Vac® style) vacuum and HEPA dust extraction vacuum system. Additionally, each bag should be handled with care and emptied slowly to avoid creating a plume of dust. Contact the manufacturer's Technical Service Department for more details on products and air quality management.
- D. Aggregate mix: For areas to be installed over 1 1/2" (4 cm) thick, aggregate may be added to reduce material costs. Mix Underlayment with water first, then add 1 part aggregate by volume of washed, well-graded 1/8" to 3/8" (3 to 9.5 mm) pea gravel. The aggregate size must not exceed 1/3 the depth of the pour. Do not use sand. Note: The addition of aggregate will diminish the workability of the product and may make it necessary to install a finish coat to obtain a smooth surface. Allow the initial application to dry for 12 to 16 hours, and then prime this layer with primer mixed 1: 1 with water. Allow the primer to dry (min. 30 minutes, max. 24 hours) before installing the neat coat of underlayment
- E. For pump installations, underlayment shall be mixed using the Automatic Mixing Pumps. recommended by the manufacturer Contact the manufacturer's Technical Service Department for complete pump operation instructions.
- F. Mix to self-leveling consistency without over-watering and in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test moisture content of substrates:
1. Per ASTM F2170, do not install if relative humidity is > 95% (15 pounds per 1000 sq. ft. per 24 hours ASTM F1869) up to and including 98% Relative Humidity (20 pounds per 1000 sq. ft. per 24 hours ASTM F 1869) without first applying TEC® The LiquiDAM® moisture mitigation membrane.
 2. For moisture sensitive floor finishes refer to the finish floor manufacturers specifications for moisture limitations. Remediation of excessive moisture conditions **must be done prior to** installation of Self Leveling Underlayment. To reduce moisture vapor emissions to an acceptable level, use material recommended by the manufacturer.
 3. Refer to finish flooring systems for additional requirements.

- B. Notify the YPS Office of Facilities Management in writing of any unsatisfactory conditions.
- C. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

- A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.
- B. Concrete: Prepare surfaces according to ICRI 310.2R, _____.
- C. Existing Concrete: Remove existing surface treatments and deteriorated and unsound concrete. Mechanically abrade base slabs to produce a heavily scarified surface profile with an amplitude of 1/4 inch
 - 1. After profiling test substrate by place drop of water, or other means to insure all coatings, sealers etc have been removed. Repeat profiling if necessary.
 - 2. Prepare and clean existing base slabs according to topping manufacturer's written instructions. Fill voids, cracks, and cavities in base slabs.
 - 3. Mechanically remove contaminants from existing concrete that might impair bond of topping.
 - 4. Saw cut existing contraction and construction joints to a depth of 1/2 inch and fill with epoxy joint filler.
- D. Install joint-filler strips where topping abuts vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- E. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- F. Vacuum clean surfaces.
- G. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- H. Close former roof and floor openings where items and equipment have been removed and as indicated..
- I. Close floor openings.

3.3 APPLICATION OF PRIMER

- A. Install products in accordance with manufacturer's instructions.
- B. Prime standard subfloors with manufacturer's recommended solvent-free primer.
 - 1. Mix Primer 1:1 with water and apply evenly with stiff bristled push broom.
 - 2. Apply an even continuous coat.
 - 3. Allow to dry to a clear film (typically 30 minutes; maximum 24 hours).
 - 4. Do not apply underlayment until the primer is dry.
 - a. To determine if the primer is dry after a minimum of 30 minutes (max. 24 hours), pour water onto the surface of the primer in several areas and rub it with your finger. If the water remains clear, the primer is dry. If the water turns cloudy or milky, additional drying time is needed.
 - 5. Primer coverage is approximately 400 to 450 sq. ft. per gallon depending on surface texture.
 - 6. Prime extremely absorbent subfloors twice.

3.4 APPLICATION OF UNDERLAYMENT

- A. Existing Concrete: Apply epoxy-bonding adhesive, mixed according to manufacturer's written instructions, and scrub into dry base slabs to a thickness of 1/16 to 1/8 inch, without puddling. Place topping while adhesive is still tacky
- B. Install underlayment in accordance with manufacturer's instructions.
- C. Pump or pour material onto substrate. Do not retemper or add water.
 - 1. Pump, move, and screed while the material is still highly flowable.

2. Be careful not to create cold joints.
 3. Wear spiked shoes while working in the wet material to avoid leaving marks.
- D. Place to required thickness, with top surface level to 1/16 inch in 10 ft (1:2000).
 - E. For final thickness over 1-1/2 inches (38 mm), place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.
 - F. Place before partition installation.
 - G. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.
 - H. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

3.5 CURING

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

Underlayment can be walked on in 2-3 hours. Moisture-insensitive tiles such as ceramic, quarry and porcelain can be installed after 6 hours. All other finish floor coverings can be installed after 16 hours at 70°F (21°C). For resinous systems such as epoxy and polyurethane floors please contact the manufacturer's Technical Services Department.

3.6 JOINT FILLING

- A. Prepare and clean contraction joints and install epoxy joint filler, according to manufacturer's written instructions, once topping has fully cured.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install epoxy joint filler full depth of contraction joints. Overfill joint and trim joint filler flush with top of joint after hardening

3.7 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field inspection and testing, as specified in Section 01 4000 - Quality Requirements.

3.8 REPAIRS

- A. Defective Topping: Repair and patch defective topping areas, including areas that have not bonded to concrete substrate

3.9 PROTECTION

- A. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

SECTION 04 0100
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Refer to Drawing A430 for General Restoration Notes.
- B. Dust control.
- C. Removal and rebuilding of exterior brick units where indicated on drawings.
- D. Salvaging and re-using existing brick units.
- E. Mortar.
- F. Repointing mortar joints where indicated and/or required.

1.3 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls.
- B. Section 07 9200 - Joint Sealants.
- C. Section 09 9113 - Exterior Painting.

1.4 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2019.
- C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- D. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- E. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International; 2008.
- F. IMIABC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.
- G. IMIABC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.
- H. New York State Parks, Recreation & Historic Preservation Brief #2 Guidelines.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
 - 1. Require attendance of parties directly affecting work of this section.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all material, including recommended installation procedures.
- C. Samples: Submit four samples of face brick units to illustrate matching color, texture and extremes of color range.
 - 1. For each type of mortar provide 6 inch long by 1/2 inch wide sample strips set in metal or plastic channels.

2. Each type of anchor
- D. Manufacturer's Instructions: For cleaning materials, indicate special procedures, conditions requiring special attention.
- E. Test reports and certifications substantiating compliance with specification requirements.
- F. Material Safety Data Sheets.

1.7 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Qualification: The sub-contractor with a minimum of five years experience, experienced masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
 1. The Installer shall directly employ the personnel performing the work of this section
 2. The Installer shall have a full time supervisor/foreman on the roof when roofing work is in progress. The Supervisor shall have a minimum of 5 years experience in roofing work similar in nature and scope to this project, and speak fluent English
 3. Submit a reference list which shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect and Owner's Representative's name - contact person and phone number.

1.8 MOCK-UP

- A. Restore and repoint an existing masonry wall area sized 4 feet (120 m) long by 2 feet (60 m) high; include in mock-up area instances of mortar, accessories, and flashings.
- B. How flashings will be built into the masonry.
- C. Locate where directed.
- D. Acceptable panel and procedures employed will become the standard for work of this section.
- E. Mock-up may remain as part of the Work.
- F. Allow samples to cure at least three days (or longer, if possible) before obtaining YPS Office of Facilities Management and Fuller and D'Angelo, P.C.'s approval for color match. Mortar colors will continue to lighten as they cure and are exposed to the weather, so samples should be installed as far in advance as possible. Samples should be viewed from a minimum distance of 12 feet.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons.
- B. Deliver material to the site in the Manufacturer's original and unopened containers and packaging, bearing labels which identify the type and names of the products and Manufacturers. Unload and handle to prevent chipping and breakage.
- C. Protect masonry materials and aggregates during storage and construction from excess wetting by rain, snow or ground water, and from staining or inter mixture with earth or other types of materials.
- D. Protect grout, mortar and cement products from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Protect liquid components from freezing.
- E. Do not overload the structure when storing materials on the roof.

1.10 FIELD CONDITIONS

- A. Repoint mortar joints and repair masonry only when air temperature is between and 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of work.

- B. Erect temporary covers over pedestrian walkways and at building entrances and exits which will remain active as the work progresses.
- C. Prevent mortar from staining the face of surrounding masonry and other building surfaces, immediately remove any which falls or spills. Protect sills, ledges and projections from mortar droppings.
- D. Coordinate masonry removal and restoration with the installation of new metal and membrane flashings

1.11 GUARANTEE

- A. Provide a Contractor's written Guarantee which warrants that all work will remain free of material and workmanship defects and in a watertight condition for a two year period beginning upon Final Completion:
 - 1. Defective work includes but is not limited to the following types of failure: leakage, delamination, lifting, loosening, splitting, cracking, and undue expansion.
 - 2. The Contractor's Guarantee shall provide that the Contractor will make the repairs and modifications necessary to enable the work to perform as warranted at his own expense:
 - 3. The Guarantee shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to affect guaranteed repairs.
- B. The Contractor's Guarantee shall be issued no more than 30 days before the satisfactory completion of punch list work.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. Cleaning Agent: ProSoCo; Sure Klean 600 Detergent
 - 1. Application: General Cleaning of new masonry units.
- B. Graffiti Protection: ProSoCo Sure Klean Blok-Guard & Graffiti Control II
 - 1. Application: Graffiti protection masonry surfaces.
 - a. Use for all masonry wall surfaces up to 10'-0" above grade.

2.2 MORTAR MATERIALS

- A. Use only factory premixed packaged dry materials for mortar and grout, with addition of water only at project site.
- B. Mortar Color: Match existing.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
 - 1. Type N for setting mortar.
 - 2. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

2.3 MASONRY MATERIALS

- A. BRICK
 - 1. Brick shall be clay or shale, ASTM C216, Type FBS, solid. Brick shall be tested for efflorescence in accordance with ASTM Test Methods C67 and the rating shall be "Not Effloresce".
 - a. Use 100% solid brick over exterior relieving angles/lintels or other brick projections on exterior face of building. (Use of solid brick with cores is acceptable if cores are filled solid with mortar and the cores are not visible to view.
 - 2. Include special bricks for corners, and other special shapes, to match the color, surface texture, shape and size of existing adjacent brick.
 - 3. Provide units with colors, surface texture, and physical properties to match existing units in size and shape.
 - a. Provide special shapes as indicated and required to match existing.

B. ARCHITECTURAL CAST STONE

1. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
 - a. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - b. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
 - c. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet (6 meters).
 - d. Remove cement film from exposed surfaces before packaging for shipment.
2. Shapes: Provide shapes indicated on drawings.
 - a. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch (3 mm) or length divided by 360, whichever is greater, but not more than 1/4 inch (6 mm).
 - b. Unless otherwise indicated on drawings, provide:
 - a) Wash or slope of 1:12 on exterior horizontal surfaces.
 - b) Drips on projecting components, wherever possible.
 - c) Raised fillets at back of sills and at ends to be built in.
3. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

2.4 MASONRY ANCHORS

- A. All reinforcement and anchors located in exterior walls shall be stainless steel.
- B. Strap Anchors: Bent steel shapes configured as required for specific situations, 1/-1/2 in (___ mm) width, 0.105 in (2.7 mm) thick, lengths as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face, corrugated for embedment in masonry joint, stainless steel.
 1. Length: Verify in field.
 2. Hohmann & Barnard weld on ties #345.
 3. #340-A by Heckman Building Products
- C. Stone Anchor Rod: Stainless steel 1/4" diameter, length as required.
- D. Repair and Restoration Anchors: mechanical anchoring system used re-connect existing veneers to backup, with 360 Brass expanders with a Type 304 St/Steel shaft and 300 St/Steel hardware
 1. "Spira-Lok" by Hohmann & Barnard, minimum 2" embed. Length to be verified in field.
- E. Restoration Anchors: Friction Pinning Anchor for anchoring existing brick to backup masonry, stainless steel, 5/16" x 7-3/4".
 1. #DA508 by Duro-Wall Masonry Accessories.

2.5 ACCESSORIES

- A. Weep Holes: Round plastic weep holes manufactured from Medium Density Polyethylene
 1. No. 341W by Hohmann & Barnard - 3/8" O.D. x 4" long. Provided with cotton wick attached
- B. Paint: Refer to Section 09 91 13 - Exterior Painting.
- C. Joint Filler: Closed cell neoprene; 3/8" inch (___ mm) wide x 3" wide x by maximum lengths available. Provide tear strip to permit sealant joint.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc; Product MS: www.h-b.com.

2.6 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing Membrane - For Steel Lintel Flashing
 - 1. Self adhered Flashing Membrane with Drip Edge: Standard type, elastomeric and thermal plastic polymers combined with Dupont Elvaloy, reinforced with synthetic fibers and calendared into 40 mil thick sheets with rubberized adhesive, 1-1/2 inch sealant compatible drip edge and disposable silicone release sheet adhered to the bottom adhesive side.
 - 2. Drip Edge: 3/8".
 - 3. Provide primers, adhesives, pre-formed inside and outside corners and dams as recommended by the manufacturer.
 - 4. Verify sealants specified in Section 07 9200 - Joint Sealants are compatible with flashing.
 - 5. Termination Bars: 1/8" stainless steel with foam seal. Use at top of all flashing.
 - 6. Manufacturers:
 - a. Hyload Inc.; 5020 Enterprise Pkwy., Seville, OH 44273. ASD. Toll Free: 800-457-4056. Phone: 330-769-3546. Fax: 330-769-4153. Web: www.hyload.com. Email: info@hyload.com.
 - b. Substitutions: See Section 01 2500 - Substitution Procedures.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces to be cleaned are ready for work of this section.

3.2 PREPARATION

- A. Protect surrounding elements from damage due to restoration procedures.
- B. Separate areas to be protected from restoration areas using means adequate to prevent damage.
- C. Cover existing landscaping with tarpaulins or similar covers.
- D. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures, including:
 - 1. Windows.
 - 2. Soft joints and sealants.
 - 3. Door frames.
 - 4. Vents, louvers and grills
- E. Close off adjacent occupied areas with dust proof partitions.
- F. When using cleaning methods that involve water or other liquids, install drainage devices to prevent runoff over adjacent surfaces unless those surfaces are impervious to damage from runoff.
- G. Do not allow cleaning runoff to drain into sanitary or storm sewers.

3.3 BRICK REMOVAL AND REPLACEMENT

- A. Carefully remove bricks on a piece by piece basis. Cut out full units from joint to joint and to permit replacement with full size units. Clean the edges of remaining bricks, to remove all mortar, dust, and loose debris in preparation for rebuilding
- B. Cut out damaged and deteriorated masonry with care in a manner to prevent damage to any adjacent remaining materials.
- C. Simultaneously remove limited sections of existing masonry; support and protect masonry remaining next to and above the removal areas
- D. Support structure as necessary in advance of cutting out units.
- E. The Contractor is responsible for performing Work in a safe manner. Provide temporary shoring or other supports as required to prevent displacement of existing masonry that is to remain. Perform the removal

Work with such care as may be required to prevent failure of the masonry or damage to adjoining masonry that is to remain

- F. Cut away loose or unsound adjoining masonry and mortar to provide firm and solid bearing for new work. Do not use impact type tools, use only rotary type grinders.
- G. Use power tools only after test cuts determine no damage to masonry units will result. Provide vacuum attachment for all grinding/cutting equipment for dust control purposes.
- H. Do not damage masonry units.
- I. Build in new units following procedures for new work. .
- J. Mortar Mix: Colored and proportioned to match existing work.
- K. Ensure that anchors, ties, reinforcing, and flashings are correctly located and built in.
- L. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings. Use a motor driven diamond blade saw to cut bricks with clean, sharp, unchipped edges.
- M. Wet brick which have initial rates of absorption (suction) of more than 30 grams per 30 square inches per minute, (in accordance with ASTM C 67), to ensure the bricks are nearly saturated with water, but surface dry when laid
- N. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min.. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid. Maintain joint width for replacement units to match existing joints.
- O. Install metal wall tie mesh in each joint.
- P. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area
- Q. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brick work

3.4 REPOINTING

- A. Perform repointing prior to cleaning masonry surfaces.
- B. Repointing of existing joint where joint reinforcing is exposed, shall be as indicated and detailed on drawings.
- C. Cut out loose or disintegrated mortar in joints to minimum 3/4" inch (19 mm) depth or until sound unweathered mortar is reached. Use power chisels die grinder, circular grinder or other power equipment approved by the YPS Office of Facilities Management.
 - 1. Test mock-up shall be performed in area directed by the YPS Office of Facilities Management. Contractor shall not proceed until mock-up and methods are approved.
 - 2. Use power tools only after test cuts determine no damage to masonry units will result.
 - 3. Provide vacuum attachment for all grinding/cutting equipment for dust control purposes.
- D. Do not damage masonry units. Do not spall the edges of adjoining masonry or widen the joints. Replace any masonry which is damaged.
- E. When cutting is complete, remove dust and loose material brushing and with water jet.
- F. Form a smooth, compact concave joint to match existing.
- G. Slightly recess pointing mortar from the faces of the masonry units where the units have rounded edges. Do not spread mortar on the edges or faces of the masonry. Do not featheredge the mortar.
- H. Tool repointed joints to match the appearance of adjoining joints when the mortar is thumbprint hard. Remove excess mortar from the edges of the joints with a soft bristle brush

- I. Moist cure for 72 hours.
- J. Clean repointed area minimum 24" each side of repointed joints.
 - 1. Immediately after the mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
 - 2. Do not use metal scrapers or brushes. Do not use acid or alkali cleaning agents
- K. Remove efflorescence by dry brushing followed by wet brushing.

3.5 CAST STONES REMOVAL AND REPLACEMENT

- A. Carefully remove the existing coping stones and mortar setting beds. Save and set the coping stones aside for reuse.
- B. Remove and reset loose bricks along the top of the parapet. Fill voids in the top of the wall with mortar, and install the sloping setting bed.
- C. Install new through wall flashings as indicated and specified in Section 07620, "Sheet Metal Flashings & Accessories".
- D. Form soft, sealant filled joints between all coping sections

3.6 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
 - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 - 2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
 - 3. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
 - 4. Drench units with clear water just before setting.
- B. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.7 LINTEL REPLACEMENT

- A. Replace lintels as follows:
 - 1. Remove existing masonry as required to expose lintel and supporting structure.
 - 2. Remove existing lintel, plates, clips, etc.
 - 3. Install conceal flashing over lintel and steel structure in accordance with manufacturer's instructions.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place continuous joint reinforcement in first and second joint below top of walls.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).

3.9 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as shown on the drawings.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches (100 mm) into adjacent masonry or turn up at least 4 inches (100 mm) to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend rubber flashings down and under masonry to within 1/4 inch (6 mm) of exterior face of masonry.
- C. Lap end joints of flashings at least 4 inches (100 mm) and seal watertight with mastic or elastic sealant.

3.11 GENERAL CLEANING AND PROTECTION PROCEDURES

- A. Protect persons and surrounding surfaces of building being restored from harm resulting from masonry restoration work.
 - 1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
 - 2. Comply with cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
 - 3. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 - 4. Keep wall wet below area being cleaned to prevent streaking from runoff.
 - 5. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 - 6. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 7. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- B. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and projections to protect from mortar droppings.
 - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 - 3. Immediately remove mortar in contact with exposed masonry and other surfaces.
 - 4. Clean mortar splatters from scaffolding at end of each day
- C. Apply all material in strict accordance with the manufacturer's instructions.
- D. Protect people, vehicles, property, plants, non masonry surfaces from product splash, residue, wind drift and fumes.
- E. Do not apply when surface and air temperature falls below 50 degrees.

3.12 CLEANING EXISTING BRICK MASONRY

- A. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar
- B. Test surface for cleaning effectiveness.
- C. Cleaning Detergent: Brush clean masonry surfaces at locations with cleaning agent in accordance with the manufacturer's instructions. Saturate masonry with clean water and flush loose mortar and dirt.

- D. Masonry Washing: Apply 400-1000 psi pressure, water flow rate of 6-8 gallons per minute, to masonry surfaces, maintaining uniform depth and surface texture throughout. Use 15-45 degree fan spray. If required heat water to 150-180 degree.
- E. Application: Work from bottom to top, pre wetting surfaces
 - 1. Let dwell 5 to 15 minutes. Do not let cleaner dry on the surface.
 - 2. Work from bottom to top and rinse
 - 3. Repeat steps as required.

3.13 CLEANING NEW BRICK MASONRY

- A. Test surface for cleaning effectiveness.
- B. Clean surfaces and remove large particles with wood scrapers, brass or nylon wire brushes.
- C. Protect area below cleaning operation and keep masonry soaked with water and flushed free of acid and dissolved mortar continuously for duration of cleaning.
- D. Before solution dries, rinse and remove acid solution and dissolved mortar, using clean, pressurized water.
 - 1. Apply 400-1000 psi pressure, water flow rate of 6-8 gallons per minute, to masonry surfaces, maintaining uniform depth and surface texture throughout. Use 15-45 degree fan spray. If required heat water to 150-180 degree.
 - 2. Let dwell 3 to 5 minutes. Do not let cleaner dry on the surface. Fresh water rinse the surfaces below areas being cleaned to prevent streaking.
 - 3. Repeat steps as required

3.14 PAINT AND GRAFFITI REMOVAL

- A. Test surface for cleaning effectiveness
- B. Apply to masonry surfaces containing paint and graffiti.
- C. Apply to dry surface in accordance to the manufacturer's recommendations.
- D. Apply using solvent resistant brush or roller. Apply at rate 1/8" to 1/4" thick
 - 1. Let dwell 15 to 60 minutes until coating shows signs of dissolving. Reapply coating as required.
 - 2. Pressure rinse, from bottom to top. Apply 400-1000 psi pressure, water flow rate of 6-8 gallons per minute, to masonry surfaces, maintaining uniform depth and surface texture throughout. Use 15-45 degree fan spray. If required heat water to 150-180 degree.
 - 3. Clean stripped area with appropriate cleaner as recommended by the manufacturer.

3.15 FIELD QUALITY CONTROL

- A. Inspectors: YPS Office of Facilities Management may engage qualified inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
- B. Notify YPS Office of Facilities Management in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

3.16 CLEANING

- A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.
- B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.
- C. Clean surrounding surfaces.

END OF SECTION

SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Concrete Masonry Unit (CMU)
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Lintels.
- E. Accessories.

1.3 RELATED REQUIREMENTS

- A. Section 04 0100 - Maintenance of Masonry.
- B. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.4 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with Editorial Revision (2018).
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- G. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- I. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2019.
- M. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- N. UL (FRD) - Fire Resistance Directory; Current Edition.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

- C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Fire Rated Assemblies: Comply with applicable code for UL (FRD) Assembly No. ____.

1.7 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 4 feet (1.2 m) long by 4 feet (1.2 m) high; include mortar and accessories in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, and other detailed conditions.
 - a. Provide bullnose units for outside corners.
 - 3. Nonloadbearing Units: ASTM C129.
 - a. Both hollow and solid block, as indicated.
 - b. Normal weight.

2.2 BRICK UNITS

- A. Refer to Section 04 0100 - Maintenance of Masonry.

2.3 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- C. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
- B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
- C. Strap Anchors: Bent steel shapes, 1-1/2 inch (38 mm) width, 0.105 inch (2.7 mm) thick, 24 inch (610 mm) length, with 1-1/2 inch (38 mm) long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M, Class B.
- D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face.

2.5 LINTELS

2.6 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Interior, loadbearing masonry: Type N.
 - 2. Interior, non-loadbearing masonry: Type N.
- B. New Mortar for Old Brick: Proportion by volume only; no more than 20 percent of the total volume of Portland cement and lime combined to be Portland cement.
 - 1. Repointing Mortar: Use proportions from 1 part lime to 2 parts sand with no Portland cement, up to 2 parts Portland cement to 3 parts lime to 6 parts sand.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.

3.2 PREPARATION

- A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Match existing.
 - 2. Mortar Joints: Match existing.

3.5 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.6 REINFORCEMENT AND ANCHORAGE - GENERAL and SINGLE WYTHE MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).
- D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

3.7 LINTELS

- A. Install loose steel lintels over openings.
- B. Maintain minimum 4 inch (100 mm) bearing on each side of opening.

3.8 GROUTED COMPONENTS

- A. Lap splices minimum 24 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.

3.9 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

3.10 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

3.11 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Shop fabricated steel items.
- B. Loose lintel where required for work under other sections.
- C. Metal bollards.
- D. Trench drain and cover.

1.3 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements for testing requirements and procedures.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 5213 - Pipe and Tube Railings.
- D. Section 09 9113 - Exterior Painting: Paint finish.
- E. Section 09 9123 - Interior Painting: Paint finish.

1.4 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- K. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).

1.5 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base

engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For the following:
 1. Lintels
 2. Metal downspout boots.
 3. Trench drain and cover.
 4. Paint products.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer, licensed in the State of New York responsible for their preparation
- D. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of New York 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.
- C. Welding: Qualify procedures and personnel according to the following:
 1. AWS D1.1, "Structural Welding Code--Steel."

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 2. Provide for trimming and fitting at site.

1.9 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.

- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work
- D. Fit and shop assemble items in largest practical sections, for delivery to site.
- E. Fabricate items with joints tightly fitted and secured.
- F. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Do not use ferrous material and equipment on stainless steel components.
 - 3. Obtain fusion without undercut or overlap.
 - 4. Remove welding flux immediately.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate
- H. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- I. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- C. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when

installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5
2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594

2.4 FABRICATED ITEMS

- A. Fixed Bollards
 1. Basis of Design Distributor: [Bollards And Sleeves,1-800-914-4771].
 2. Diameter:4 inches
 3. Material: Schedule 40 steel pipe galvanized
 4. Cap bollards with prefabricated 1/4-inch- thick steel cone cap.
 5. Sleeves steel pipe 1/4-inch thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.
 6. Security Lock 9/16 Eyebolt Welded for padlock for removable bollards.
 7. Concrete filled for fixed bollards.
 8. Provide 2" reflective tape.
 9. Prime and finish paint.
- B. Lintels: As detailed; Fabricate and prime paint. Refer to Section 09 9123 for finish coat..
 1. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated
 2. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.
 3. Galvanize loose steel lintels located in exterior walls.
 4. Refer to lintel sizes as noted on drawings. Provide 4"x4"x 5/16" if not indicated.
- C. Trench Cover and Liner:
 1. Polymer Concrete KS200 Channel System With Stainless Steel Edge Rails As Manufactured By Aco Polymer Products, Inc,4211 Pleasant Rd. Fort Mill, SC 29708 Tel: 440-639-7230.
 - a. Manufacturer shall be ISO 9001:2000 Certified
 - b. Trench liners shall be Aluminum, ASTM B 209, alloy 5052-H32,[0.063 gauge, with closed ends.
 - c. Fasteners, accessories, and other materials required for complete installation to manufacturer's instructions.
 - d. Exposed aluminum surfaces shall be clear anodized finish.
 - e. Aluminum surfaces in contact with concrete shall be prime painted.
 2. Access Covers shall be aluminum, ASTM B 209, alloy 6061-T651 for plate; frames shall be aluminum, ASTM B 221, alloy 6063-T5 for extrusions.
 - a. Materials
 - a) Channels shall be manufactured from polyester resin polymer concrete with an integrally cast-in stainless steel edge rail.
 - b) Minimum Properties Of Polymer Concrete Will Be As Follows:
 - c) Compressive strength: 14,000 psi.
 - d) Flexural strength: 4,000 psi
 - e) Tensile strength: 1,500 psi
 - f) Water absorption: 0.07%
 - g) Frost proof .

- h) Dilute acid and alkali resistant.
 - i) B117 salt spray test compliant
 - b. The System shall be 8" (200mm) nominal internal width with Aa10.2" (260mm) overall width and a built-in slope of 0.5%. Channel invert shall have developed "V" shape. All channels shall be interlocking with a male/female joint.
- 3. Substitutions: Refer to Section 01 2500 Substitution Procedures.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

2.7 FINISHES - STEEL

- A. Refer to Section 09 9123 Interior Painting and Section 09 9113 Exterior Painting.
- B. Prime paint steel items.
 - 1. Prime paint all steel items except:
 - a. Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- C. Prepare surfaces to be primed in accordance with SSPC-SP2.
- D. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- E. Prime Painting: One coat.
 - 1. Interior ferrous metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664.
 - a. Refer to Section Section 09 9123 Interior Painting for preparation, prime coats and finish coats for all interior exposed ferrous metal.
- F. Galvanizing of Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft (530 g/sq m) galvanized coating.
 - 1. Locations: All exterior steel and lintels set in exterior walls.

2.8 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install fabricated items as per manufacturer's instructions
- B. Install items plumb and level, accurately fitted, free from distortion or defects.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field weld components as indicated on shop drawings.
- E. Perform field welding in accordance with AWS D1.1/D1.1M.
- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

**SECTION 05 5213
PIPE AND TUBE RAILINGS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Free-standing railings at steps.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 09 9113 - Exterior Painting: Paint finish.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- F. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2010e1.
- G. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications; 2013, with Editorial Revision (2014).
- H. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding the allowable design working stress of materials for handrails, railings, anchors, and connections:
 - 1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbf/ft. applied horizontally and concurrently with uniform load of 100 lbf/ft. applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 - 2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbf/ft. applied in any direction.

- c. Concentrated and uniform loads above need not be assumed to act concurrently.
- 3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 200 lbf applied to 1 sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.
 - a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guards.
- B. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Samples: Submit two, 12 inch (25 mm) long samples of handrail. Submit two samples of elbow, wall bracket, end stop, and finish welding.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement.

1.7 QUALITY ASSURANCE

- A. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.6, "Structural Welding Code--Stainless Steel."
- B. Fabricator Qualifications:
 - 1. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience in producing handrails and railing similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 2. All railings and handrails specified in this Section to be fabricated and installed by the same firm.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- C. Allow for expansion and contraction of members and building movement without damage to connections or members.

- D. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- F. Dimensions: See drawings for configurations and heights.
 - 1. Top Rails and Bottom Rails: 1-1/2 inches (38 mm) diameter, round.
 - 2. Posts: 1-1/2 inches (38 mm) diameter, round.
- G. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, form or core drill holes not less than 5" (127 mm) deep and 3/4" (19 mm) greater than outside diameter of post. Clean holes of loose material. Insert posts and fill annular space between post and concrete with non-metallic grout, mixed and placed to comply with anchoring material according to manufacturer's direction.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
- H. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- C. Exposed Fasteners: No exposed bolts or screws.
- D. Straight Splice Connectors: Steel welding collars.
- E. Galvanizing: In accordance with requirements of ASTM A123/A123M.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 BRACKETS, CONECTORS AND MISCELLANEOUS ITEMS

- A. Wedge-Lock Welding Connector: Wagner steel connector to align railings. Weld all joints.
 - 1. Galvanized for exterior locations

2.4 MISCELLANEOUS MATERIALS

- A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
 - 1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.5 FABRICATION

- A. Provide complete assemblies including handrails, railings, clips, brackets other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces
- B. Shop Assembly: Pre-assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
- C. Accurately form components to suit specific project conditions and for proper connection to building structure.
- D. Fit and shop assemble components in largest practical sizes for delivery to site.
- E. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work
- G. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- H. Close exposed ends of railing members with prefabricated end fittings.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work
- J. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

2.6 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize all exterior steel and iron railings, including hardware, after fabrication.
 - 2. Comply with ASTM A 123/A 123M .

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Concealed wood blocking, nailers, and supports toilet accessories and hardware.
- B. Miscellaneous wood nailers, furring, and grounds.

1.3 RELATED REQUIREMENTS

- A. Section 08 5113 - Aluminum Windows.
- B. Section 10 2800 - Toilet And Bath Accessories.
- C. Section 12 2940 - Roller Shades.
- D. Section 12 3200 - Plastic Laminated Casework.

1.4 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- B. AWWA U1 - Use Category System: User Specification for Treated Wood; 2017.
- C. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- E. PS 20 - American Softwood Lumber Standard; 2015.
- F. WPA G-5 - Western Lumber Grading Rules; 2017.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on lumber, plywood, fasteners, and application instructions .
- C. Shop drawings, or 2 foot long on-site samples which show the size, shape, configuration and method of fastening for all wood blocking assemblies, and which show how the blocking assemblies will relate to other adjoining work.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- E. Material Safety Data Sheets

1.6 QUALITY ASSURANCE

- A. A firm (Installer) with not less than 5 continuous years experience performing carpentry work comparable to that required for this project, employing personnel skilled in the work specified.
- B. The Installer shall directly employ the personnel performing the work of this section.
- C. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
 - 1. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee.

2. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Deliver and store materials dry at all times.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a two (2) year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 1. Wood, including shims, nailers, blocking, furring and similar members, in the sizes indicated, worked into the shapes shown.
 2. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee.
 3. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.
 4. Pre-Work Conference: Attend the pre-roofing meeting to discuss how carpentry work will be performed and coordinated with other work.
 5. Species: Douglas Fir, unless otherwise indicated, construction grade solid lumber free of splits, large knots and other imperfections.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association; WWPA G-5.
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: Kiln-dry or MC15.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.

2.3 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 1. General: Provide fasteners of size and type that comply with requirements specified in this article by the authority having jurisdiction, International Building Code, International Residential Code, Wood Frame Construction manual, and National Design Specification
 2. Metal and Finish: Hot-dipped galvanized steel as per ASTM A153/A153M for exterior, wet areas, and high humidity areas and for other wood locations.
 3. Use screws wherever possible, minimum size diameter #12. If nails are used they shall be annular ring shank type. Do not use dry wall screws to secure wood blocking assemblies.
 4. Anchors: Toggle bolt type for anchorage to hollow masonry.

2.5 FACTORY WOOD TREATMENT

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Towel and bath accessories.
 - 3. Visual display boards
 - 4. Windows.

3.4 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated or required as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.

3.6 CLEANING AND PROTECTION

- A. General: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

**SECTION 07 8400
FIRESTOPPING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.3 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2018c.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015.
- D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).
- E. ITS (DIR) - Directory of Listed Products; current edition.
- F. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- G. FM (AG) - FM Approval Guide; current edition.
- H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- I. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- J. UL (FRD) - Fire Resistance Directory; Current Edition.
- K. UL 2079 - Standard Test Method of Fire Resistant Joints

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:

PART 2 PRODUCTS

2.1 MATERIALS

- A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.2 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.3 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

- A. Gypsum Board Walls:
 - 1. Wall-to-Wall Joints That Have Movement Capabilities (Dynamic-D):
 - a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
 - 2. Head-of-Wall Joints at Concrete Over Metal Deck:
 - a. 2 Hour Construction: UL System HW-D-0034; Specified Technologies Inc. ES Elastomeric Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0043; Specified Technologies Inc. AS200 Elastomeric Spray.
 - 3. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

2.4 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Penetrations Through Floors or Walls By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 1 & 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 & 2 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 3. Electrical Cables Not In Conduit:
 - a. 1 & 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
 - 4. Insulated Pipes:
 - a. 1 & 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX intumescent Firestop Sealant.
 - 5. HVAC Ducts, Uninsulated:
 - a. 1 & 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- B. Penetrations Through Floors By:
 - 1. Multiple Penetrations in Large Openings:

- a. 1 & 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
- 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 & 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
- 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
- C. Penetrations Through Walls By:
 - 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3095; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 4. HVAC Ducts, Uninsulated:
 - a. 1 & 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
 - 5. HVAC Ducts, Insulated:
 - a. 1 & 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.5 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
- B. Penetrations By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 3. Electrical Cables Not In Conduit:
 - a. 1 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
 - 4. Insulated Pipes:
 - a. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 5. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

- b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.6 MATERIALS

- A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
 - 1. Manufacturers:
 - a. 3M Fire Protection Products; Product CP-25WB: www.3m.com/firestop.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:
 - 1. Density: 4 lb/cu ft (_____ kg/cu m).
 - 2. Manufacturers:
 - a. Thermafiber, Inc; Product ____: www.thermafiber.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.3 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

3.4 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

**SECTION 07 9200
JOINT SEALANTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.
- B. Section 07 2500 - Weather Barriers: Sealants required in conjunction with water-resistive barriers.
- C. Section 07 8400 - Firestopping: Firestopping sealants.
- D. Section 07 9513 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
- E. Section 08 8001 - GLAZING: Glazing sealants and accessories.
- F. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.4 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012 (Reapproved 2017).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.
- G. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.

6. Sample product warranty.
7. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Fuller and D'Angelo, P.C. and submit at least two physical samples for verification of color of each required sealant.
- F. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- C. Field Adhesion Test Procedures:
 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 2. Have a copy of the test method document available during tests.
 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Fuller and D'Angelo, P.C..

1.7 MOCK-UP

- A. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution:
 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 1. Bostik Inc: www.bostik-us.com.
 2. Dow Corning Corporation: www.dowcorning.com/construction.
 3. Sika Corporation: www.usa-sika.com.
 4. W.R. Meadows, Inc: www.wrmeadows.com/sle.

- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
 - 1. Sika Corporation: www.usa-sika.com.
 - 2. W.R. Meadows, Inc: www.wrmeadows.com.

2.2 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 6116.

2.3 NONSAG JOINT SEALANTS

- A. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
 - 2. Applications: Use for:
 - a. Use for all perimeter joints of toilet fixtures, cabinets, casework, countertops and similar locations..
 - 3. Manufacturers:
 - a. 786 Mildew Resistant; Dow Corning.
 - b. Pecora Corporation; 898 Silicone Sanitary Sealant: www.pecora.com.
 - c. Sika Corporation; Sikasil GP: www.usa-sika.com.
 - d. Sanitary 1700; GE Silicones..
 - 4. Substitutions: 01 2500 - Substitution Procedures
- B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus ____ percent, minimum.
 - 2. Color: To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.
 - 3. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
 - 4. Manufacturers:
 - a. Pecora Corporation; Dynatrol I;: www.pecora.com.
 - b. Sika Corporation; Sikaflex-1a: www.usa-sika.com.
 - 5. Applications: Use for:
 - a. Joints between metal frames and other materials.
 - b. All exterior and interior vertical joints.
 - 6. Substitutions: 01 2500 - Substitution Procedures
- C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-hardening, non-sagging; not intended for exterior use.
 - 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
 - 2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
 - 3. Manufacturers:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: www.pecora.com.
 - b. Sherwin-Williams Company; 850A Acrylic Latex Caulk: www.sherwin-williams.com.
 - c. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com.
 - 4. Applications: Use for:
 - a. Use for all interior joints where required.
 - 5. Substitutions: 01 2500 - Substitution Procedures

2.4 SELF-LEVELING SEALANTS

- A. Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M, and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: Limestone.
 - 4. Tensile Strength: 200 to 250 psi (1.38 to 1.72 MPa) in accordance with ASTM D412.
 - 5. Manufacturers:
 - a. Pecora Corporation; DynaTrol II-SG (Slope Grade): www.pecora.com.
 - b. Tremco Commercial Sealants & Waterproofing; THC-901: www.tremcosealants.com.
 - 6. Use for all exterior horizontal joints in walkways and pavements.

2.5 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 - 3. Open Cell: 40 to 50 percent larger in diameter than joint width. (Not to be used in flat or horizontal joints)
 - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width. (Use for flat and horizontal joints)
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Fuller and D'Angelo, P.C. of date and time that tests will be performed, at least seven days in advance.
 - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Fuller and D'Angelo, P.C..
 - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Self-leveling joints: Recess joint depth as recommended by the sealant manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Fire-rated hollow metal doors and frames.

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry.
- B. Section 08 7100 - Door Hardware.
- C. Section 09 9123 - Interior Painting.

1.4 ABBREVIATIONS AND ACRONYMS

- A. HMMA: Hollow Metal Manufacturers Association.
- B. SDI: Steel Door Institute.
- C. UL: Underwriters Laboratories.

1.5 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- G. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- I. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- K. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2019.
- M. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- N. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

- O. ITS (DIR) - Directory of Listed Products; current edition.
- P. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- Q. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- R. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- T. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
- U. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- V. UL (BMD) - Building Materials Directory; current edition.
- W. UL (DIR) - Online Certifications Directory; Current Edition.
- X. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations.
 - 1. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 3. Locations of reinforcement and preparations for hardware.
 - 4. Details of anchorages, joints, field splices, and connections.
 - 5. Details of accessories.
 - 6. Details of moldings, removable stops, and glazing.
- D. Samples: If requested by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. Submit two samples of metal, 2 by 2 inches (51 by 51 mm) in size, showing factory finishes, colors, and surface texture.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years documented experience and SDI Certified.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.
- D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

- 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.
- F.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.10 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Substitutions: See Section 01 2500 Substitution Procedures .

2.2 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Beveled.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - a. Provide 14 gauge channel reinforcing for all door closers.

7. Galvanizing including all doors and frames: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.

2.3 STEEL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Interior Fire-Rated Doors:
 1. Grade: ANSI A250.8 Level 4, physical performance Level A, Model 1, full flush continuous welded.
 - a. Door Face Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
 - b. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - a. Temperature-Rise Rating (TRR) Across Door Thickness: 250 degrees F (121 degrees C) maximum.
 - b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - c. Attach fire rating label to each fire rated unit.
 3. Door Core Material: Vertical steel stiffeners, max. 6" o.c. spot welded to door face.
 4. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
 5. Door Face Sheets: Flush.
 6. Door Finish: Factory primed and field finished.
 7. Product:
 - a. Curries, an Assa Abloy Group Company; Series 707: www.assaabloydss.com.
 - b. Ceco Door, an Assa Abloy Group company; Legion: www.assaabloydss.com.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Fire-Rated: Full profile/continuously welded type..
 1. Fire Rating: Same as door, labeled.
 2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.

2.5 FINISHES

- A. Refer to Section 09 91 23 Interior Painting.
- B. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.6 ACCESSORIES

- A. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- D. Frame Anchors: Minimum of six wall anchors and two base anchors.
 1. T anchors for masonry.
- E. Frame Repairs:
 1. Repair dents, patch rust holes, fill in chips etc.
 2. Body Filler With Hardener.

3. Color: Light Gray.
4. Manufacturer: 3M Product "Bondo Body Filler 265".

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated and NAAMM HMMA 840.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 7100.

3.4 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 1613
FIBERGLASS DOORS AND ALUMINUM FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Fiberglass reinforced polyester (FRP) doors.
- B. Aluminum Thermal Break Frames for fiberglass reinforced polyester doors.
- C. Snap trim.
- D. Factory installed Finish Hardware
- E. Insulated Infill panels.
- F. Foam door seal.
- G. Accessories.

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry
- B. Section 05 5000 - Metal Fabrications for steel lintels.
- C. Section 08 7100 - Door Hardware.
- D. Section 08 8000 - Glazing.

1.4 REFERENCE STANDARDS

- A. AAMA 1304 - Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems; 2018.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- C. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance of Steel Doors and Hardware Reinforcing.
- D. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents
- E. ASTM D 570 - Water Absorption of Plastics
- F. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- G. ASTM-B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- H. ASTM-B117 – Standard Practices for Operating Salt Spray (Fog) Apparatus.
- I. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- J. ASTM-C518 – Standard test Method for Steady-State Thermal Transmission Properties by Means of Heat
- K. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- L. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- M. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.

- N. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2016.
- O. ASTM-D3029 – Test Methods for Impact Resistance of Flat Rigid Plastic Specimens by Means of a Tup (Falling Weight) (Withdrawn 1995) (Replaced by ASTM-D5420).
- P. ASTM D 6670 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products
- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- R. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- S. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- T. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- U. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- V. ASTM-E1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- W. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- X. ASTM F 476 - Security of Swinging Door Assemblies.
- Y. ASTM-F1642-04 – Standard Test Method for Glazing Systems Subject to Air Blast Loading.
- Z. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
- C. Test Reports: Show compliance with specified criteria.
- D. Shop Drawings: Show layout and profiles; include assembly methods. Shop drawings to be prepared by door manufacturer.
 - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
 - 2. Indicate wall conditions, door and frame elevations, at 1/2" scale, half-sized detail sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on Drawings to identify details and openings. expansion provisions, and other components not included in the manufacturer's standard data. Include glazing details
- E. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
 - 1. Where normal color and texture variations are expected, include two or more units in each sample to show the range of such variations.

- F. Architect reserves the right to require samples of typical fabricated section, showing joints, exposed fastenings (if any), quality of workmanship, hardware and accessory items, before fabrication of the work proceeds.
- G. Door Corner Sample: Submit corner cross sections, 10 inches (254 mm) by 10 inches (254 mm) in size, illustrating construction, finish, color, and texture.
- H. Manufacturer's Qualification Statement.
- I. Maintenance Data: Include instructions for repair of minor scratches and damage.
- J. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Yonkers Public Schools's name and registered with manufacturer; include detailed terms of warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than ten years of documented experience.
 - 1. Door and frame components from same manufacturer.
 - 2. Evidence of a compliant documented quality management system.
- B. Standards: Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA, and AA, including the terminology definitions, and specifically including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated.
- C. All materials, equipment and operation supplied shall conform to all Code requirements including Accessibility for the Handicapped.
- D. Installer Qualifications: Company specializing in installing products of the type specified in this section with not less than five (5) years of documented experience, and approved by the manufacturer..
- E. The manufacturer shall provide a factory trained technician to visit this project and instruct the installers in the proper installation of the door and frame assemblies.

1.8 FIELD MEASUREMENT:

- A. Verify field measurements prior to fabrication of doors and frames to insure proper fitting of assemblies. Successful bidders are expected to field verify all dimensions, sizes, quantities and the material required to complete this project. Failure to do so will not relieve the successful contractor from the necessity of furnishing any and all materials that may be required, without any additional costs to the Owner.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Mark doors with location of installation, door type, color, and weight.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Materials shall be inspected for damage, and the manufacturer shall be advised immediately of any discrepancies. Unsatisfactory materials are not to be used
- C. Handling: Protect materials and finish from damage during handling and installation.
- D. Store materials in original corrugated packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
 - 1. Doors shall be "floated" within cartons, with no portion of the door having contact with the outer shell of the container.
 - 2. Store at temperature and humidity conditions recommended by manufacturer.
 - 3. Do not use non-vented plastic or canvas shelters.
 - 4. Immediately remove wet wrappers.
 - 5. Store in position recommended by manufacturer, elevated minimum 4 inches (102 mm) above grade, with minimum 1/4 inch (6.4 mm) space between doors.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Special Project Warranty:
 - 1. Provide a written warranty signed by Manufacturer, Installer and Contractor, agreeing to replace, at no cost to the YPS Office of Facilities Management, any doors or frames that fail in materials or workmanship, within the time period of acceptance, as indicated below. Failure of materials or workmanship includes excessive deflection, faulty operation of entrances, deterioration of finish, or construction, in excess of normal weathering, and defects in hardware, weather stripping, and other components of the work. In addition the manufacturer further certifies that they have factory installed all hardware and such hardware is also guaranteed not to come loose during the guarantee period.
 - 2. Warranty Time Period: Ten Years from substantial completion.
 - 3. In addition, a limited lifetime (while the door is in its specified application in its original installation) warranty covering: Failure due to corrosion on FRP components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass Reinforced Plastic (FRP) Doors:
 - 1. Special-Lite, Inc; PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com. E-Mail info@special-lite.com.: www.special-lite.com.
 - 2. Subject to compliance with requirements, other manufacturers are acceptable:
 - a. Tubelite - Reed City, Michigan
 - b. FRP Architectural Doors, Inc. Bensalem, Pa.

2.2 ALUMINUM DOOR FRAMES

- A. General:
 - 1. Materials and Accessories
 - a. Aluminum Members: Provide 6061 or 6063-T5, alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate, with a minimum wall thickness of 0.125".
 - b. All materials shall be of the same manufacturer. No splitting of Door and Frame components will be permitted for aluminum frames.
 - c. Fasteners: Provide Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors, and other items being fastened. For exposed fasteners (if any), provide Phillips head flat head screws with finish matching the item to be fastened.
 - d. Do not use exposed fasteners, except where unavoidable for the assembly of units, or unavoidable for the fastening of hardware. Provide only concealed screws in glazing stops.
 - e. Reinforcement and Brackets: Manufacturer's standard formed or fabricated steel units, of shapes, plates, of bars, with 2.0 ounce hot-dip zinc coating, complying with ASTM A 123, applied after fabrication.
 - f. Expansion Anchor Devices: Lead shield or toothed steel, drilling expansion bolt anchors.
 - g. Bituminous Coating: Cold applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.
 - h. Sealants and Gaskets: Provide sealants and gaskets in the fabrication, assembly and installation of the work, which are recommended by the manufacturer to remain permanently elastic, non-shrinking, non-migrating and weatherproof.

- i. Hardware:
 - a) Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
 - b) Factory install door hardware.
 - j. Anchors:
 - a) Anchors appropriate for wall conditions to anchor framing to wall materials.
 - b) Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
 - c) Secure head and sill members of transom, side lites, and similar conditions.
 - k. Applied Door Stops.
 - a) 5/8" x 1-1/4" or 5/8" x 1-3/4", 0.125" wall thickness, with screws and weather-stripping.
 - b) Provide solid 1/2" aluminum bar behind door stop for closer shoe attachment.
 - c) Pressure gasketing for weathering seal.
 - d) Counter punch fastener holes in door stop to preserve full-metal thickness under fastener head.
 - e) Minimum 1/2" aluminum bar reinforcement under doorstop for required hardware attachments, aluminum to meet ASTM-B221.
 - l. Pressure gasketing for weathering seal.
 - m. Counter punch fastener holes in door stop to preserve full-metal thickness under fastener head.
 - n. Caulking: Caulk joints before assembling frame members.
 - o. g. Frame Member to Member Connections:
 - a) Secure joints with fasteners.
 - b) Provide hairline butt joint appearance.
- B. Thermally Broken Aluminum Storefront Framing:
- 1. Model: SL-600TB, Special-Lite, Inc
 - 2. Size and Type: As indicated on the Drawings.
 - 3. Profiles: 6 inch (150 mm) deep, 2 inch (51 mm) wide at jambs, and 2 inch (51 mm) wide at headers.
 - 4. Perimeter Frame Members:
 - a. Storefront frame with thermally broken pocket filler.
 - b. Factory fabricated by frame manufacturer.
 - c. Open-back framing is not acceptable.
 - 5. Thermal Strut.
 - a. Fiber reinforced plastic, no other materials will be accepted.
 - 6. Hardware
 - a. Pre-machine and reinforce frame members for hardware in accordance with manufacturer's standards and door hardware schedule.
 - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
 - c. Factory install door hardware.
 - 7. Anchors:
 - a. Anchors appropriate for wall conditions to anchor framing to wall materials.
 - b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
 - c. Secure head and sill members of transom, side lites, and similar conditions.

2.3 VISION LITES

- A. Factory Glazing: Refer to Section 08 8000 Glazing.

2.4 FIBERGLASS REINFORCED POLYESTER (FRP) DOORS:

- A. Model.
 - 1. SL-17 Pebble Grain FRP/ Aluminum Hybrid Door.
- B. Door Size:
 - 1. See Door Schedule.
- C. Construction.
 - 1. Door Thickness.
 - a. 1-3/4".
 - 2. Stiles & Rails.
 - a. Aluminum extrusions made from 6063 aluminum alloys with a minimum temper of T5.
 - b. Minimum 2-5/16" deep one-piece extrusion with have integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - c. Screw or snap in place applied caps are not acceptable.
 - d. Top rails must have integral legs for interlocking continuous extruded aluminum flush cap.
 - e. Bottom rails must have integral legs for interlocking continuous weather bar with single nylon brush weather stripping or manually adjustable SL-301 door bottom with two nylon brush weather stripping.
 - f. Meeting stiles to include integral pocket to accept pile brush weather seal.
 - 3. Corners.
 - a. Mitered.
 - b. Secured with 3/8" diameter full-width steel tie rod through extruded splines top and bottom which are integral to standard tubular shaped rails.
 - c. 1-1/4" x 1-1/4" x 3/16" 6061 aluminum angle reinforcement at corner to give strong, flat surface for locking hex nut to bear on.
 - d. Weld, glue, or other methods of corner joinery are not acceptable.
 - 4. Core.
 - a. Poured-in-place polyurethane foam.
 - b. Laid in foam cores are not acceptable.
 - c. Foam Plastic Insulated Doors: Comply with all requirements of NYSBC 2603.4.
 - a) Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
 - b) Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.
 - c) Comply with IBC/NYSBC 2603.4.1.7. Foam plastic insulation having a flame spread index of less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when a thermal barrier of metal minimum 0.032" aluminum or 0.016" steel is provided between the foam core and face sheet.
 - d) Standard door assembly can be tested to show it meets these requirements without the use of thermal barrier. Testing shall be in compliance with IBC/NYSBC 2603.9. If no independent testing conducted all doors with foam plastic core must have a thermal barrier..
 - 5. Face Sheet.
 - a. Exterior
 - a) 0.120" thick, pebble texture, through color with integral surfaseal film FRP sheet.
 - b) Flame Spread Rating: Class C.
 - b. Interior

- a) 0.120" thick, pebble texture, through color with integral surfaseal film FRP sheet.
 - b) Flame Spread Rating: Class A .
- c. Attachment of face sheet.
 - a) Extruded stiles and rails to have integral reglets to accept face sheet on both interior and exterior side of door which secure face sheet into place and permit flush appearance.
 - b) Use of glue to bond face sheet to core or extrusions is not acceptable.
- 6. Cutouts.
 - a. Manufacture doors with cutouts for required vision lites, louvers, and panels.
- 7. Hardware.
 - a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
 - b. Surface mounted closures will be reinforced for but not prepped or installed at factory.
 - c. Factory install door hardware.
- 8. Reinforcements.
 - a. Aluminum extrusions made from 6061 or 6063 aluminum alloys.
 - b. Sheet and plate to conform to ASTM-B209.
 - c. Alloy and temper to be selected by manufacturer for strength, corrosion resistance, and application of required finish, and control of color.
 - d. Bars and tubes to meet ASTM-B221.

2.5 INSULATED INFILL PANELS

- A. Infill Panels: IP: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
 - 1. Thickness: 2-5/8.
 - 2. Exterior Skin: Aluminum 0.050 inch (1 mm) thick.
 - 3. Insulation Core: Isocyanurate insulation core with R value of 14.56.
 - 4. Exterior Substrate: 3/16" High density tempered hardboard inch (4.7 mm) thick.
 - 5. Interior Substrate: 1/2" Gypsum Board
 - 6. Interior Skin: Aluminum 0.050 inch thick
 - 7. Interior and Exterior Finish: high performance organic coating .
 - 8. Warranty: 25 years.
 - 9. Product: "Mapes-R" as manufactured by Mapes Architectural Panels; sales@mapes.com / www.mapespanels.com

2.6 FINISH HARDWARE:

- A. Provide and factory install finish hardware for each door leaf as specified in Division 8 "Finish Hardware".
- B. SL-84, 8-11/16" high, 6" wide, 1-3/8" recess and 1-1/2" bottom opening for all FRP doors
- C. SL-301 Concealed adjustable brush. Install door manufacturer's multi-directional adjustable bottom with double nylon brush weatherstripping. Door bottom must be concealed and adjust to accommodate irregular tapered floor conditions.
- D. Concealed Adjustable Meeting Stile Astragal at Pairs of Doors. Install door manufacturer's adjustable astragal with double pile weather seal weatherstripping.
- E. Receive Hardware supplied in accordance with this Section, and coordinate with additional Hardware requirements of Section 08 7100. Report discrepancies (in writing) to the Architect immediately.
- F. Reinforce, cut, drill and tap doors and frames as required to receive Hardware, except do not drill and tap for surface mounted closers and holders, which will be applied at the jobsite. Comply with Hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

1. Reinforcement:
 - a. Stile Edge: 1" High density mineral, FRP Edge Banding.
 - b. Top Rail: 6" High density mineral.
 - c. Bottom Rail: 2" High density mineral.
- G. Install all Hardware, except surface mounted closers and holders, at the fabrication plant. Remove only Hardware as required for final finishing or delivery to jobsite. Package and identify such Hardware and ship with doors and frames for installation at the project site.
- H. Painting: All existing surfaces to remain exposed, and all disturbed areas shall be painted to match existing surfaces.
- I. Hinge and hardware fasteners Stainless steel Type 304

2.7 FABRICATION:

- A. Door and frame components from the same manufacturer.
- B. Sizes and Profiles: The required sizes for door and frame units, and profiles requirements are shown on the drawings.
- C. Co-ordination of Fabrication: Check the actual frame or door openings in the construction work by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress, as directed by Contractor, and avoid delays of the work.
- D. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to the cleaning, finishing, treatment and application for coatings. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- E. No Welding of joints will be accepted.
- F. Conceal fasteners, wherever possible, except as otherwise noted.
- G. Maintain continuity of line and accurate relation of planes and angles. Provide secure attachments and support at mechanical joints, with hairline fit at contacting members.
- H. Reinforce the work as necessary for performance requirements, and for support to the structure. Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.
- I. Shop Fabrication
 1. All shop fabrication to be completed in accordance with manufactures process work instructions.
 2. Quality control to be performed before leaving each department.
- J. Shop Fabrication
 1. All shop fabrication to be completed in accordance with manufactures process work instructions.
 2. Quality control to be performed before leaving each department.

2.8 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 and Wind Zone 4 - Additional Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
- C. Forced Entry Resistance: Pass in accordance with AAMA 1304 test method.
- D. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf (359 Pa).

- E. Air Leakage: Maximum of 0.1 cfm per square foot at 6.27 psf (0.5 L/sec/sq m at 300 Pa) differential pressure, when tested in accordance with ASTM E283.
- F. Structural Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
- G. Thermal Transmittance, Exterior Doors: AAMA 1503, U-value of 0.35, maximum, measured on exterior door in size required for this project.
- H. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
 - 1. Izod Impact Resistance: ASTM D256, 7 foot-pound force per inch of width (9.5 Nm per 25.4 mm of width), minimum, with notched izod.
 - 2. Tensile Strength at Break: ASTM D638, 13,250 psi (91.4 MPa), minimum.
 - 3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F (23 degrees C).
 - 4. Provide Door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding stock systems according to test methods designated.
 - 5. Ignition Barrier: Doors not requiring a fire resistance rating shall comply with the requirements of IBC-2015 Section 2603.4.1.7. Foam plastic insulation shall have a flame spread index of 75 or less and a smoke-developed index of not more than 450. Door facings shall have a minimum thickness of 0.032" (0.8mm) aluminum sheet or steel having a base metal thickness of not less than 0.016" (0.4mm) at any point. Manufacturer may alternatively submit an evaluation and testing report from an acceptable agency, confirming testing, accordance with 2603.9, has been completed indicating compliance.
 - 6. Thermal Barrier: Insulated panels shall conform to the requirements of IBC-2015 2603.4. Foam plastic shall be separated from the interior of a building by an approved thermal barrier of 0.5-inch (12.7 mm) gypsum wallboard or equivalent thermal barrier material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 1275.
 - 7. Face Sheet.
 - a. Standard Interior and Exterior Class C 0.120" thick, pebble texture, through color with integral surfaseal film FRP sheet.
 - a) Flexural Strength, ASTM-D790: 21 x 103 psi.
 - b) Flexural Modulus, ASTM-D790: 0.7 x 106 psi.
 - c) Tensile Strength, ASTM-D638: 13 x 103 psi.
 - d) Tensile Modulus, ASTM-D638: 1.2 x 106 psi.
 - e) Barcol Hardness, ASTM-D2583: 55.
 - f) Izod Impact, ASTM-D256: 14.0 ft-lb/in.
 - g) Gardner Impact Strength, ASTM-D5420: 120 in-lb.
 - h) Water Absorption, ASTM-D570: 0.20%/24hrs at 77°F.
 - i) Surface Burning, ASTM-E84: Flame Spread ? 200, Smoke Developed ? 450.
 - j) Taber Abrasion Resistance, Taber Test: 0.007% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
 - k) Chemical ResistanceChemical Resistance.
 - (a) Excellent Rating.
 - 8. Door Core.
 - a. Density, ASTM-D1622: ≤ 5.0 pcf.
 - b. Compressive Properties, ASTM-D1621: Compressive Strength ≥ 60 psi, Compressive Modulus ≥ 1948 psi.

- c. Tensile and Tensile Adhesion Properties, ASTM-D1623: Tensile Adhesion, 3" x 3" FRP Facers ≥ 53 psi, Tensile Adhesion, 1" x 1" Foam ≥ 104 psi.
- d. Thermal and Humid Aging, ASTM-D2126: Volume Change at 158 °F, 100% humidity, 14 days $\leq 13\%$.
- e. Thermal Conductivity, ASTM-C518, Thermal Resistance ≥ 0.10 m²K/W.
- 9. Door Panel.
 - a. Thermal Transmittance, AAMA 1503-98: U-Factor = 0.29 Btu/hr²°F, CRFp = 55.
 - b. Indoor Air Quality, ASTM-D5116, ASTM-D6607: GreenGuard, GreenGuard Gold.
- 10. Door and Aluminum Tube Frame Assembly.
 - a. Physical Endurance, ANSI A250.4: 25,000,000 Cycles, No Damage.
 - b. Salt Spray, ASTM-B117: 500 hours minimum exposure.
 - c. Air Leakage, NFRC 400, ASTM-E283.
 - a) Opaque Swinging Door (< than 50% glass)
 - (a) 0.01 cfm/sqft @ 1.57 psf.
 - (b) 0.01 cfm/sqft @ 6.24 psf.
 - b) Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - (a) 0.38 cfm/sqft @ 1.57 psf.
 - (b) 0.73 cfm/sqft @ 6.24 psf.
 - d. Structural Performance, ASTM E-330.
 - a) Single or Pair of Doors, 8'4" x 8'2" overall size, single point latching.
 - (a) ± 75 psf design pressure, pass.
 - e. Impact and Cycle Test, ASTM-E1886.
 - a) Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
 - (a) 9 lbs. missile @ 50 fps, minimum 3 impacts, no rips, tears, or penetrations.
 - (b) ± 75 psf design pressure, pass.
 - f. Forced Entry, AAMA 1304.
 - a) Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
 - (a) 300lb Pull Test, pass.
 - g. Impact Test, TAS 201.
 - a) Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
 - (a) 9 lbs. missile @ 50 fps, minimum 3 impacts, no rips, tears, or penetrations.
 - h. Static Air Pressure, TAS 202.
 - a) Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
 - (a) ± 65 psf design pressure, pass.
 - (b) Forced Entry, 300lb Pull Test, pass.
 - i. Cyclic Wind Pressure Loading, TAS 203.
 - a) Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
 - (a) ± 65 psf design pressure, pass.
 - j. Security Test, ASTM-F476: Minimum Grade 40.
 - k. Blast Test, ASTM-F1642.
 - a) 6 psi @ 45 psi-msec, minimal hazard, operable.
- 11. Door and Thermally Broken Aluminum Frame Assembly.
 - a. Thermal Transmittance, NFRC 100.
 - a) Opaque Swinging Door (< than 50% glass)
 - (a) U-Factor = 0.31 Btu/hr²°F.
 - b) Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - (a) U-Factor = 0.64 Btu/hr²°F.

- b. Air Leakage, NFRC 400, ASTM-E283.
 - a) Opaque Swinging Door (< than 50% glass)
 - (a) 0.01 cfm/sqft @ 1.57 psf.
 - (b) 0.01 cfm/sqft @ 6.24 psf.
 - b) Commercially Glazed Swinging Entrance Door (> than 50% glass)
 - (a) 0.38 cfm/sqft @ 1.57 psf.
 - (b) 0.73 cfm/sqft @ 6.24 psf.
- c. Sound Transmission, ASTM-E90: STC = 30, OITC = 29.

2.9 FINISHES

- A. Door Trim:
 - 1. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils (0.01 mm) thick.
- B. Tube Frames:
 - 1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions
 - 2. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 50% polyvinylfluoride resin by weight; complying with AAMA 2604.
 - 3. Color: As selected by Architect from manufacturer's standard colors.
- C.
- D. FRP Face Sheets:
 - 1. Through color.
 - 2. Color: As selected by Architect from manufacturer's standard colors..

2.10 ACCESSORIES

- A. Foam window and door seal.
 - 1. Fill all exterior joint between windows and doors solid in accordance with manufacture's instructions.
 - 2. Cut back to permit application of joint sealant.
 - 3. Insulating-Foam Sealant: Dow Great Stuff Window & Door.
- B. Snap Trim as required. Match door and frame finish.
- C. Glazing: See Section 08 8000.
- D. Door Vision Lite Frames: Frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
- E. Lite Kits:
 - 1. Provide and factory install a Special-Lite FL-Series 2 piece extruded aluminum Class I Clear Anodized Lite Kit. Provide as per the drawings.
 - 2. Size as indicated on drawings.
 - 3. Factory Glazing: Refer to Section 08 8000 - Glazing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.

- B. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

- A. Remove existing doors and frames, and dispose of all removed materials in accordance with local authorities having jurisdiction.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean and prepare substrate in accordance with manufacturer's directions.
- D. Protect adjacent work and finish surfaces from damage during installation.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Install exterior doors in accordance with ASTM E2112.
- C. Set units plumb, level, and true-to-line, without warping or racking doors or frames, and with specified clearances; anchor securely in place.
- D. Set thresholds in continuous bed of sealant.
- E. Install perimeter sealant in accordance with requirements specified in Section 07 9005.
 - 1. Fill all exterior spaces and joint between windows and doors solid with foam in accordance with manufacture's instructions.
 - 2. Cut back to permit application of joint sealant.
- F. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- G. Repair or replace damaged installed products.

3.4 ADJUSTING

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

3.5 CLEANING

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- B. Do not use harsh cleaning materials or methods that would damage finish.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.
- C. Provide protective treatment and other precautions required through the remainder of the construction period, to ensure that the doors and frames will be without damage or deterioration (other than normal weathering) at the time of acceptance.

END OF SECTION

SECTION 08 7101
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
- C. Related Sections:
 - 1. Section 06 1000 - Rough Carpentry.
 - 2. Section 08 1113 - Hollow Metal Doors and Frames.
 - 3. Section 08 1613 - Fiberglass Doors and Aluminum Frames.
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. Section 01 4100 - Regulatory Requirements: State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.

- c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
- 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum five (5) years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum three (3) years documented experience installing both standard and electrified door hardware 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. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum five (5) years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware

Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Section 01 3000 - Administrative Requirements. Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Section 01 3000 - Administrative Requirements with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware, hollow metal, and FRP doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - a. Notify YPS Office of Facilities Management five (5) day prior to meeting.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide hardware supplier and installer shall inspect and written documentation to YPS Office of Facilities Management and Fuller and D'Angelo, P.C. that all components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to YPS Office of Facilities Management via registered mail or overnight package service. Instructions for delivery to the YPS Office of Facilities Management shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual surface door closer bodies.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for YPS Office of Facilities Management's continued adjustment, maintenance, and removal and replacement of door hardware. Refer to Section 01 7900 - Demonstration and Training.
- B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Section 01 2500 - Substitution Procedures. Approval of requests is at the discretion of the YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
 - 1. Fuller and D'Angelo, P.C. will not review or approve substitutions during the bidding phase.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing hinges unless Hardware Sets indicate heavy weight.
 - 4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed.
 - 5. Acceptable Manufacturers:
 - a. McKinney Products (MK). ASSA ABLOY Architectural Door Accessories (MK) - TA Series.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE

2.3 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 5. Keyway: Match Facility Standard
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.

- E. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key locks to match Owner's existing system.
- F. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Three (3).
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
 - 4. Construction Control Keys (where required): Two (2).
 - 5. Permanent Control Keys (where required): Two (2).
- G. Construction Keying: Provide temporary keyed construction cores.
- H. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.4 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
 - 1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
 - 2. Locks are to be non-handed and fully field reversible.
 - 3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 2 million cycles.
 - 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) – CL3300 Series.
 - b. Sargent Manufacturing (SA) – 10 Line.

2.5 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.6 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
- C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
1. Provide keyed removable feature where specified in the Hardware Sets.
 2. Provide stabilizers and mounting brackets as required.
 3. Provide electrical quick connection wiring options as specified in the hardware sets.
 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - 700/900 Series.
 - b. Sargent Manufacturing (SA) - 980S Series.

2.7 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 - a. All closer covers shall be metal.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC8000 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.
 - c. Norton Door Controls (NO) - 7500 Series.

2.8 ARCHITECTURAL TRIM

- A. Door Protective Trim
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
 4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, .050-inch thick.
 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
 6. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other

types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:
 - a. Rockwood Manufacturing (RO).

2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated .
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
 1. National Guard Products (NG).
 2. Pemko Manufacturing (PE).
 3. Reese Enterprises, Inc. (RS).

2.11 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.12 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Notify YPS Office of Facilities Management of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 3. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 07 9200 - Joint Sealants.
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in written report, submitted to the YPS Office of Facilities Management, whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 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.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware. Refer to Section 01 7900 - Demonstration and Training for additional requirements.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
 2. RU - Corbin Russwin
 3. SA - SARGENT
 4. NO - Norton
 5. MC - Medeco
 6. RO - Rockwood
 7. PE - Pemko
 8. OT - Other

3.9 HARDWARE SETS

Set: 1.0

Doors: 126-PR, 127-PR

2	Continuous Hinge	CFMSLF-HD1		PE
1	Mullion	L980	PC	SA
2	Rim Exit Only Device	LC 16 8810 EO	US32D	SA
3	Cylinder	As Required x Temp Core	626	RU
3	Permanent Core	Compatible with Existing System	26	MC
2	Flush Pull	By FRP Assembly Manufacturer		OT
2	Surface Closer	UNI7500	689	NO
1	Threshold	253x3AFG MSES25SS-2		PE

Set: 2.0

Doors: 100, 104, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 117, 118, 125, 129.

2	Continuous Hinge	CFMSLF-HD1		PE
1	Mullion	L980	PC	SA
2	Rim Exit Only Device	LC 16 8810 EO	US32D	SA
2	Rim Exit Device, Storeroom	LC 16 8804 Less Pull	US32D	SA
4	Cylinder	As Required x Temp Core	626	RU

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4	Permanent Core	Compatible with Existing System	26	MC
2	Flush Pull	By FRP Assembly Manufacturer		OT
2	Surface Closer	UNI7500	689	NO
1	Threshold	253x3AFG MSES25SS-2		PE

Set: 3.0

Doors: 122

1	Continuous Hinge	CFMSLF-HD1		PE
1	Rim Exit Device, Storeroom	LC 16 8804 Less Pull	US32D	SA
2	Cylinder	As Required x Temp Core	626	RU
2	Permanent Core	Compatible with Existing System	26	MC
1	Flush Pull	By FRP Assembly Manufacturer		OT
1	Door Closer	7500 / P7500	689	NO
1	Wall Stop	400 / 441CU	US26D	RO
1	Threshold	253x3AFG MSES25SS-2		PE

Set: 4.0

Doors: 101, 102, 103, 105, 116, 119, 120, 121, 126-SGL, 127-SGL, 128.

1	Continuous Hinge	CFMSLF-HD1		PE
1	Rim Exit Device, Storeroom	LC 16 8804 Less Pull	US32D	SA
2	Cylinder	As Required x Temp Core	626	RU
2	Permanent Core	Compatible with Existing System	26	MC
1	Flush Pull	By FRP Assembly Manufacturer		OT
1	Surface Closer	UNI7500	689	NO
1	Threshold	253x3AFG MSES25SS-2		PE

Set: 5.0

Doors: 123, 124

1	Continuous Hinge	CFMSLF-HD1		PE
1	Storeroom Lock	CL3357 PZD CT6B	626	RU
1	Permanent Core	Compatible with Existing System	26	MC
1	Surface Closer	UNI7500	689	NO
1	Threshold	253x3AFG MSES25SS-2		PE

Set: 6.0

Doors: 150, 151, 152, 153, 154

3	Hinge, Anchor, Hvy Wt (Sq. Edge Door)	TA792 5" x 4-1/2"	US26D	MK
1	Classroom Lock	CL3355 PZD CT6B	626	RU
1	Door Closer	7500 / P7500	689	NO

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DOOR HARDWARE

1	Kick Plate	K1050 - 10" x 2" LDW x 4BE x CSK	US32D-316	RO
1	Wall Stop	400 / 441CU	US26D	RO
1	Gasketing	S773BL		PE

END OF SECTION

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Insulated Laminated safety glass.
- B. Glazing compounds.

1.3 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 1613 - Fiberglass Doors and Aluminum Frames: Glazed lites installed in doors and transoms.

1.4 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- C. Sealed Insulating Glass Unit Surface Designations:
 - 1. Surface 1 - Exterior surface of the outer glass lite.
 - 2. Surface 2 - Interspace surface of the outer glass lite.
 - 3. Surface 3 - Interspace surface of the inner glass lite.
 - 4. Surface 4 - Interior surface of the inner glass lite.
- D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.5 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- F. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2018c.
- H. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- J. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

- K. GANA (SM) - GANA Sealant Manual; 2008.
- L. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- M. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
- O. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- P. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.
- Q. New York State Section 2406 Safety Glazing.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data for each glass product and glazing material indicated. Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch (300 by 300 mm) in size of glass units.
- E. Samples: Submit 6 inch (150 mm) long bead of glazing sealant, color as selected.
- F. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- G. Certificate: Certify in writing and signed by manufacturers that products of this section meet or exceed specified requirements.
- H. Manufacturer's qualification statement.
- I. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- J. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Yonkers Public Schools's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (SM) and GANA (LGRM) for glazing installation methods.
- B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Manufacturers Alliance
- C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, Insulating Glass Manufacturers Alliance ANSI Z97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials
- D. Where glazing units, including Kind FT glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf or less in area, provide glazing products that comply with Category I or II materials.
- E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum Ten (10) years of documented experience and meet ANSI / ASQC Q9002 1994.
- F. Fabricator Qualifications: Manufactured Certified as acceptable to the manufacturer

- G. Installer Qualifications: Company specializing in performing work of the type specified and with at least five (5) years documented experience and approved by the fabricator.
- H. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type:
 - 1. Clear float glass.
 - 2. Coated float glass.
 - 3. Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.
- I. Insulating Glass products are to be permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
 - 1. Single Source fabrication responsibility: All fabrication processes, including Low E and reflective coatings, insulating, laminating, silkscreen, and tempering, shall be fabricated by a single Fabricator.
- J. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating glass units that will be exposed to substantial altitude changes, comply with insulating glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
- B. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure:
 - a. Positive Design Pressure: 40 psf.
 - b. Negative Design Pressure: 40 psf.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

3. Specified Design Snow Loads: As indicated on Drawings, but not less than snow loads applicable to Project as required by ASCE 7, Minimum Design Loads for Buildings and Other Structures: Section 7.0, Snow Loads
 4. Probability of Breakage for Vertical Glazing: 0% lites per 1000 for lites set vertically or not more than 15 degrees off vertical
 - a. Wind Load Duration: Short duration, as defined in ASTM E 1300 .
 5. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 6. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
1. In conjunction with weather barrier related materials described in other sections, as follows:
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 3. Refer to window, storefront, and glazed aluminum curtain wall specification sections for overall thermal transmittance requirements.

2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - a. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - b. For uncoated glass, comply with requirements for Condition A.
 - c. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

2.3 INSULATING GLASS UNITS GENERAL

- A. Space between lites filled with gas as required to maintain Thermal Transmittance Overall U-value.
- B. Total Thickness: 1 inch (25.4 mm).
1. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.38 , nominal.
- C. Solar Heat Gain Coefficient (SHGC): 0.39, nominal.
- D. Insulated Laminated Glazing:
1. Outboard Lite: Fully tempered float glass.
 - a. Low-E Coating: Vitro Architectural Glass (formerly PPG Glass) Solarban 60 on #2 surface.
 - b. Tint: Clear.
 - c. Thickness: 1/4 inch (6.4 mm) minimum
 2. Inboard Lite: Laminated Safety Glass,.
 - a. Tint: Clear.
 - b. Thickness: 1/4 inch (6.4 mm) minimum

- c. Glass Type: Heat-strengthened float glass (Laminated)
- d. Tint: Clear
- e. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
- 3. Total Thickness: 1 inch.
- 4. Use for exterior doors and as indicated on drawings.
- 5. Substitutions: Refer to Section 01 2500 -Substitution Procedures .

2.4 GLAZING COMPOUNDS

- A. As recommended by the manufacturer.

2.5 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 - 1. Width: As required for application.

2.6 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements

2.7 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements and individual sections requirements.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 GLAZING SYSTEM:

- A. Manufacturer's standard factory-glazing system that produces weather tight seal. Refer to Section 08 1613 Fiberglass Doors and Aluminum Frames and Section 08 5113 Aluminum Windows.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

3.6 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove nonpermanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.7 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

3.8 SCHEDULE

- A. Refer to door and window schedule and drawings for location and/or requirements.

END OF SECTION

**SECTION 09 3000
TILING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Stone thresholds and base trim.

1.3 RELATED REQUIREMENTS

- A. Section 03 5400 - Cast Underlayment.
- B. Section 04 2000 - Unit Masonry.

1.4 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2017.
 - 1. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
 - 2. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
 - 3. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2017.
 - 4. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Reaffirmed 2016).
 - 5. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014.
 - 6. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile; 2008 (Reaffirmed 2013).
 - 7. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.
 - 8. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- B. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2017.
- C. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2017.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for Yonkers Public Schools's use in maintenance of project.
 - 1. Extra Tile: 2 percent of each size, color, and surface finish combination.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- B. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.7 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up incorporating all components specified for the location.
 - 1. Minimum size of mock-up 8' x 8'.
 - 2. Approved mock-up may remain as part of work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

PART 2 PRODUCTS

2.1 TILE

- A. Porcelain Floor Tile: Group B1 fully vitrified.
 - 1. Moisture Absorption: <0.1 percent as tested in accordance with ISO 10545-3.
 - 2. Size: As indicated on Finish Schedule.
 - 3. Thickness: 3/8"
 - 4. Shape: Rectangle.
 - 5. Edges: Square.
 - 6. Surface Finish: Unglazed, Non-slip, to comply with or exceed R10 A+B DIN 51130 > 0.40.
 - 7. Color(s): As indicated on Finish Schedule.
Pattern: As indicated on drawings
 - 8. Products:
 - a. Casalgrande Padana distributed by Prospec, 798 Pelham Parkway Pelham Manor, NY 10803.
 - b. Substitutions: Refer to Section 01 2500 - Substitution Procedures.
- B. Glazed Wall Tile: ANSI A137.1, standard grade and as follows:
 - 1. Size: As indicated on Finish Schedule.
 - 2. Edges: Square.
 - 3. Surface Finish: As indicated on drawings..

4. Color(s): As indicated on drawings.
5. Trim Units: Matching cove shapes in sizes indicated.
6. Products:
 - a. United States Ceramic Tile.
7. Substitutions: Section 01 2500 Substitution Procedures.

2.2 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 1. Applications:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.
 - c. Floor to Wall Joints: Cove base.
 2. Manufacturers: Same as for tile.
- B. Thresholds: 2 inches (51 mm) wide by full width of wall or frame opening; beveled edge on both long edges; without holes, cracks, or open seams.
 1. Material: Marble, honed finish.
 2. Applications:
 - a. At doorways where tile terminates.
- C. Stone Base Trim: 6 inches (155 mm) wide by 48"; straight edge on both long edges; without holes, cracks, or open seams.
 1. Thickness: 3/4 inch (19 mm).
 2. Material: Granite, honed finish.
 3. Color : Black.
 4. Applications:
 - a. At base of Corridor wall as indicated..

2.3 SETTING MATERIALS

- A. Manufacturers:
 1. Mapei Corporation. Product: ULTRAFLEX 2.
 2. Substitutions: Section 01 2500 Substitution Procedures.

2.4 ADHESIVE MATERIALS

- A. Manufacturers:
 1. Mapei Corporation; Product MAPEI TYPE 1: www.mapei.com.
 2. Substitutions: Section 01 2500 Substitution Procedures.

2.5 GROUTS

- A. Manufacturers:
 1. Mapei Corporation ; Product Mapei Ultracolor, Plus FA
 2. Substitutions: Section 01 2500 Substitution Procedures.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
 3. Color(s): As selected by Fuller and D'Angelo, P.C. from manufacturer's full line.

2.6 MAINTENANCE MATERIALS

- A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.

1. Composition: Water-based colorless silicone.

2.7 ACCESSORY MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers
- C. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.
 1. Products: MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout
 - a. Provide sealer coat over all tile floors

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive. Refer to TCNA (HB) EJ 171 for location and frequency of joints.
- I. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method as indicated on drawings , with standard grout, unless otherwise indicated.

3.5 INSTALLATION - WALL TILE

- A. Over interior concrete and masonry install in accordance with TCNA (HB) Method as indicated on drawings.

3.6 CLEANING

- A. Clean tile and grout surfaces.

3.7 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. New and Replacement of acoustical panels and suspended grid indicated on drawings.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07 9200 - Joint Sealants.
- C. Section 08 5113 - Aluminum Windows: For modifications to existing ceilings.
- D. Section 12 2940 - Roller Shades.
- E. Divisions 23 and 26 for air outlets and inlets, light fixtures, and fire alarm.

1.4 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- E. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.
- F. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- G. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.
- H. Ceilings and Interior Systems Construction Association (CISCA): Code of Practices.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two samples 12 x 12 inch (300 by 300 mm) in size illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 12 inches (300 mm) long, of suspension system main runner.

- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.7 QUALITY ASSURANCE

- A. Fire Performance: ASTM E84 surface burning characteristics. Flame Spread index 25 or less. Smoke development index 50 or less. (UL Labeled) Class A in accordance to ASTM E1264
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.
- D. Installers Qualifications: Company specializing in the installation of acoustical ceilings specified in this section with minimum 5 years documented experience.
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by YPS Office of Facilities Management and Fuller and D'Angelo, P.C..
 - 3. Refinish mock-up area as required to produce acceptable work.
- F. Pre-installation Conference: Conduct conference at Project site minimum one week before removal and installation. Agenda shall include project conditions, coordination with work of other trades, and layout of items which penetrate ceilings.

1.8 EXTRA MATERIALS

- A. See Section 01 6000 - Product Requirements.
- B. Deliver extra acoustical units for YPS Office of Facilities Management's use in maintenance. Label and store where directed by the YPS Office of Facilities Management including codes used on the Drawings. Do not deliver to the Project site until the YPS Office of Facilities Management is prepared to receive and store maintenance materials.
 - 1. Panels: Furnish 5 percent of total acoustic unit area of extra panels to YPS Office of Facilities Management.
 - 2. Suspension System Components: Furnish 5 percent of each exposed component of the quantity installed.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver in unopened bundles and store in a dry place with adequate air circulation. Do not deliver material to building until wet conditions such as concrete, plaster, paint, and adhesives have been completed and cured.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Protect system components from excessive moisture in shipment, storage, and handling

1.10 WARRANTY

- A. Warranty: Provide manufacturer's standard warranty against manufacturing defects in material or workmanship when installed in accordance with the current Cisca Handbook and ASTM C367.
 - 1. Warranty Period: 30 years.

1.11 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Acoustical Panels, Type ACT-1 & ACT-2: Painted wet formed mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Form 2, Pattern C E; Fire Class A.
 - a. Type III, Form 1, Pattern E I, Fire Class A.
 - 2. Size: 24 by 24 inches (610 by 610 mm) and 24 by 48 inch (610 by 1219 mm) as indicated on drawings
 - 3. Thickness: 7/8 inches (2.1875 mm).
 - 4. Light Reflectance: 0.85 percent, determined in accordance with ASTM E1264.
 - 5. NRC Range: 0.75, determined in accordance with ASTM E1264.
 - 6. Articulation Class (AC): 170 , determined in accordance with ASTM E1264.
 - 7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 8. Panel Edge: Square.
 - 9. Color: White.
 - 10. Suspension System Type Prelude XL: Exposed grid.
 - 11. Products:
 - a. Armstrong World Industries, Inc: www.armstrongceilings.com.
 - a) Cirrus High NRC 563 for 24 x 24.
 - b) Cirrus High NRC 565 for 24 x 48
 - b. Substitutions: See Section 01 2500 - Substitution Procedures..

2.2 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc; Product Prelude XL 15/16": www.armstrong.com.
 - 2. Structural Classification: Intermediate duty, ASTM C 635.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required.

2.3 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
 - 1. Minimum 7/8" horizontal flange
- D. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 9200 - Joint Sealants.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.2 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.3 INSTALLATION - SUSPENSION SYSTEM

- A. Repair and Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
- H. Do not eccentrically load system or induce rotation of runners.

3.4 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit existing grid, tile and provide new units as required at new windows.
 - 2. Make field cut edges of same profile as factory edges.
- F. Install seismic clips or stabilizer bars as per code requirements.

3.5 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 ADJUSTING AND CLEANING

- A. Replace damaged or broken material, Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with mfg., touch up procedures using Armstrong Item #5760 8 oz, touch up paint as required for small nicks and minor scratches in the surface, Remove and replace any work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
 - 1. Provide touch up kit for YPS Office of Facilities Management's use.

3.7 SCHEDULE

- A. As indicated on drawings.

END OF SECTION

**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Preparation and Underlayment.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.3 RELATED REQUIREMENTS

- A. Section 02 2080 - Asbestos Removal and Disposal.
- B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.4 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017.
- B. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring; 2006 (Reapproved 2018).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- E. ASTM F925: Standard Test Method for Resistance to Chemicals of Resilient Flooring.
- F. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).
- G. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2013a.
- H. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- I. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
- J. ASTM F-1869 Test Method for Measuring Moisture Vapor Emissions in Concrete.
- K. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2017.
- L. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs.
- M. ASTM F2420 - Standard Test Method for Determining Relative Humidity on the Surface of Concrete
- N. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.
- O. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.
- P. Recycled Content: No
- Q. ISO 9001 – Quality Management System: Meets and exceeds passing requirements
- R. ISO 14001 – Environmental Management System: Meets and exceeds passing requirements

- S. FloorScore® Certified: Yes
- T. Environmental Product Declaration, EPD® (SCS Global Services): Verified

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Verification Samples: Submit two samples, 12" x 12" in size illustrating color and pattern for each resilient flooring product specified.
- D. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.
- E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. MSDS (Material Safety Data Sheets) should be submitted for all adhesives used:
 - 1. Membrane, primer, patch, leveler, heat weld rod, cold weld, liquid wax and cleaning agents
- H. Maintenance Materials: Furnish the following for Yonkers Public Schools's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Materials: Furnish one box of tile for each fifty boxes or fraction thereof, for each type, color, pattern and size of the tile installed, from same manufactured lot as materials installed.
 - a. Deliver extra tile to Owner after completion of work.
 - b. Furnish tiles in protective packaging with identifying labels.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum 10 years documented experience, with resilient flooring of types equivalent to those specified.
 - 1. Manufacturers proposed for use, which are not named in this section, shall submit evidence of ability to meet performance requirements specified not less than 10 days prior to bid date.
 - a. Color Matching: Provide resilient flooring products, including wall base and accessories, from one manufacturer to ensure color matching.
 - b. Manufacturer capable of providing technical training and field service representation.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions

1.8 MOCK UP

- A. Field Samples per Section 001 4000 - Quality Requirements. Provide field samples, dry laid, to demonstrate aesthetic effects of materials in place.

1.9 FIELD CONDITIONS

- A. Store materials for not less than 48 hours before, during, and 72 hours after installation, in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

1.10 PRE-INSTALLATION TESTING

- A. Conduct pre-installation testing as follows:
 - 1. ASTM F-1869 Test Method for Measuring Moisture Vapor Emissions in Concrete Maximum: 3 lbs/1000 SF
 - 2. ASTM F-2170 Test Method for Determining Relative Humidity in Concrete: Maximum RH: 55%.

1.11 WARRANTY

- A. Provide manufacturer's non-prorated ten (10) year limited warranty to be free from defects in material and workmanship, under normal use and service, to repair or replace all defective tiles including reasonable labor.

PART 2 PRODUCTS

2.1 TILE FLOORING

- A. Vinyl Composition Tile (HVT): Homogeneous, with color extending throughout thickness.
 - 1. Manufacturers:
 - a. As indicated on finish schedule drawing.
 - b. TOLI International, a Division of CBC (AMERICA) Corp, Telephone: 800.446.5476;; 800.446.5476; Fax: 631.864.8151; E-mail; Product Terraline.
 - c. Substitutions: Sec Section 01 2500 - Substitution Procedures
 - 2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 4. Size: 18 by 18 inch (450 by 450 mm).
 - 5. VOC Content Limits: As specified in Section 01 6116.
 - 6. Thickness: 0.120 inch (3 mm).
 - 7. Pattern: As indicated on drawings.
 - 8. Adhesives: As recommended by the manufacturer.
 - 9. Color: As indicated on drawings.
- B. Installation Method: Full Spread.
- C. Adhesive: As recommended by the manufacturer.

2.2 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and Style A straight for carpet installation as follows:
 - 1. Manufacturers:
 - a. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 3. Height: 4 inch (100 mm) and 2-1/2 inch (62 mm).
 - 4. Thickness: 0.125 inch (3.2 mm).
 - 5. Length: 4 foot (1.2 m) sections.
 - 6. Color: Solid color as indicated on drawings.

2.3 ACCESSORIES

- A. Subfloor Crack and Joint Repair: Two-part polyurethane repair compound .
 - 1. 100% solids for no shrinkage
 - 2. Service temperature range of -35° to 110°F (-37° to 43°C),
 - 3. Product:"Ardex ArdiFix", Ardex Engineered Cements, 400 Ardex Park Drive, Aliquippa, PA 15001 USA, Tel: 724-203-5000
- B. Tile Adhesives: Provide water-resistant, type adhesive acceptable and compatible with HVT manufacturer to suit floor tile product and substrate conditions indicated. Contractor option to provide one of the following:
 - 1. Epoxy Adhesive: 2-Part epoxy; CBC 951 as manuf., by Toli Corp. (CBC Flooring)
 - 2. Spray Adhesive: Water based; CBC ECOSpray U, as manuf., by Toli Corp. (CBC Flooring)
- C. Moisture Control System: One-coat moisture control system that suppresses excessive moisture vapor emissions in existing concrete prior to the installation of finished flooring.
 - 1. Product: Ardex MC Rapid, Moisture Control System, Ardex Engineered Cements, 400 Ardex Park Drive, Aliquippa, PA 1500, 888-512-7339, www.ardex.com.
- D. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Internal Relative Humidity: ASTM F2170.
 - b. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Moisture Testing: Moisture testing shall be performed using ASTM test method ASTM F 2170 in situ Relative Humidity Test. The acceptable test result when using test method F 2170 should not exceed seventy five per cent (75%) AND pH readings should not exceed 9.0.
- E. Verify that existing concrete sub floor do not containing curing compound by placing 1/4 cup of water on surface. If water beads up scarify surface.
- F. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Existing flooring shall be removed by Asbestos sub-contractor. Refer to Section 02 2080.
 - 1. Do not proceed until removal is completed and clearances authorized.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Concrete substrate that fully conforms to the requirements of ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring is required, or as detailed in the manufacturer's Installation Guide.
- D. Crack and Joint Repair:

1. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface up to 1/2".
 2. Dry diamond blade may be used to prepare cracks and create a clean surface for bonding.
 3. Do not use sweeping compounds, solvents or acid etching to prepare the surface.
 4. Cracks or joints should be free of dust, dirt, oils and any other debris.
 5. New concrete should be fully cured and free of movement.
 6. Prohibit traffic until filler is fully cured.
 7. Fill the crack, joint or repair area so the material is slightly higher than the face of the concrete slab.
 8. Allow to set for approximately 10 to 15 minutes (at 75° F), and then use a sharp razor scraper to shave excess material from the top of the slab.
 9. For bidding purposes assume 30 l.f. of crack repair.
- E. Underlayment: All concrete substrates must be solid, thoroughly clean and free of oil, wax, grease, asphalt, latex and gypsum compounds, curing compounds, sealers and any contaminant that might act as a bond breaker.
1. **Mechanically profile with grinder 100% of all existing substrates receiving resilient flooring. Provide dust control as required.**
 - a. After profiling test substrate by place drop of water, or other means to insure all coatings, sealers etc have been removed. Repeat profiling if necessary.
 2. Use trowelable leveling and patching compound, according to manufacturer's written instructions, to fill cracks, holes and depressions in substrates.
 3. Provide leveling compound over 100% of all existing substrates receiving resilient flooring
- F. Moisture Mitigation Barrier: Install moisture mitigation coating in accordance with manufacturer's requirements.

3.3 INSTALLATION GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- Adhesive-Applied Installation:
1. Spread only enough adhesive to permit installation of materials before initial set as recommended by the manufacturer.
 2. Fit joints and butt seams tightly.
 3. Set flooring in place, press with heavy roller to attain full adhesion.
- C. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
1. Resilient Strips: Attach to substrate using adhesive.
- E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- F. Install flooring in recessed floor access covers, maintaining floor pattern.
- G. Install feature strips where indicated.
- H. Do not mix manufacturing batches of a color within the same area.
- I. Do not install resilient flooring over building expansion joints.
- J. Do not install defective or damaged resilient flooring.
- K. Layout resilient flooring to provide equal size at perimeter. Adjust layout as necessary to reduce the amount of resilient flooring which is cut to less than half full width.
- L. Install resilient flooring without voids at seams. Lay seams together without stress.

- M. Remove excess adhesive immediately

3.4 INSTALLATION TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.
 - 1. Lay tiles square with room axis, unless otherwise indicated.

3.5 INSTALLATION RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.6 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.
- C. Cleaning of Vinyl Composition Tile
 - 1. Sweep or dust mop to remove dirt and grit. Do not use treated dust mops.
 - 2. Add heavy duty cleaner to cool water following the manufacturer's instructions.
 - 3. Remove the solution with a wet-dry vacuum or auto scrubber until floor is dry and free of residue.
 - 4. Rinse the floor with clean water. Repeat the rinse process as necessary to remove all haze and residue.
 - 5. Apply three to five coats of high gloss or matte floor finish following the manufacturer's instructions.

3.7 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation and 72 hours heavy rolling loads.

3.8 SCHEDULE

- A. Refer to Finish Schedule on drawings.

END OF SECTION

**SECTION 09 9113
EXTERIOR PAINTING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish newly installed exterior surfaces or exterior surfaces affected by construction activities exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Glass.
 - 6. Concealed pipes, ducts, and conduits.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 5000 - Metal Fabrications: Shop-primed items.
- C. Section 09 9123 - Interior Painting.

1.4 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.5 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- F. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).
- G. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").

2. MPI product number (e.g. MPI #47).
 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
 2. Where sheen is not specified, discuss sheen options with Fuller and D'Angelo, P.C. before preparing samples, to eliminate sheens not required.
 3. Allow 15 days for approval process, after receipt of complete samples by Fuller and D'Angelo, P.C..
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Yonkers Public Schools's use in maintenance of project.
1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 3. Label each container with color in addition to the manufacturer's label.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five (5) years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three (3) years experience.

1.8 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide column & beam assembly illustrating paint color, texture, and finish.
- C. Locate where directed by Construction Manager.
- D. Mock-up may remain as part of the work.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.10 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company; www.sherwin-williams.com.
- C. Substitutions: See Section 01 2500 - Substitution Procedures

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Colors: As indicated on drawings.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including galvanized and primed metal.
- B. Ferrous Metals, Unprimed Alkyd: Provide the following finish systems over unprimed exterior ferrous metal:
 - 1. Rust inhibiting, modified phenolic alkyd resin primer: Two finish coats over primer
 - a. Primer: Sherwin WilliamsKem Kromik Universal Metal Primer spreading rate recommended by manufacturer to achieve a dry film thickness of 3.3 to 4.4 mils.
 - 2. Topcoat: Two Coats Alkyd applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.6mils
 - a. Sherwin Williams: Pro Industrial Urethan Alkyd Enalmel.
- C. Ferrous Metals, Unprimed, Latex, 3 Coat:
 - 1. Rust inhibiting, modified phenolic alkyd resin primer: 2 finish coats over primer
 - a. Primer: Sherwin WilliamsKem Kromik Universal Metal Primer spreading rate recommended by manufacturer to achieve a dry film thickness of 3.3 to 4.4 mils.
 - 2. Topcoat: Acrylic Latex applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.1 to 4.2 mils
 - a. Sherwin Williams: Pro Industrial Acrylic.
- D. Ferrous Metals, Primed, Alkyd, 2 Coat:
 - 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.

2. Topcoat: Two Coats Alkyd applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.6mils
 - a. Sherwin Williams: Direct To Metal Alkyd.
- E. Ferrous Metals, Primed, Latex, 2 Coat:
 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
 2. Topcoat: Acrylic Latex applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.5 to 4.0
 - a. Sherwin Williams: Pro Industrial Acrylic.
- F. Galvanized Metals, Alkyd, 3 Coat:
 1. One coat galvanize primer.
 2. Two coats of alkyd enamel :
 - a. Intermediate coat: Alkyd enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.6.
 - a) Sherwin Williams Direct To
 - b. Finish coat: Alkyd enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.6.
 - a) Sherwin Williams Direct To Metal Alkyd Enamel Semi-Gloss Pure White

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Galvanized Surfaces:
 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 2. Prepare surface according to SSPC-SP 2.
- H. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 3. Remove rust, loose mill scale, and other foreign substances by power wire brushing, power sanding, power grinding, power tool chipping and power tool descaling, using methods

recommended in writing by paint manufacturer and SSPC-SP 3. Protect from corrosion until coated.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Sand metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish newly installed interior surfaces or any finished surfaces disturbed by construction activities exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Steel doors and frames
 - 2. Concrete masonry units (CMU).
 - 3. Exposed surfaces of steel lintels
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Ceramic and other tiles.
 - 9. Brick, architectural concrete.
 - 10. Glass.
 - 11. Acoustical materials, unless specifically indicated.
 - 12. Concealed pipes, ducts, and conduits.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 04 2000 - Unit Masonry.
- C. Section 05 5000 - Metal Fabrications: Shop-primed items.
- D. Section 05 5213 - Pipe and Tube Railings.
- E. Section 09 2400 - Cement Plastering.
- F. Section 09 9300 - Staining and Transparent Finishing: Stage wood stairs and trim.

1.4 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.5 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

- D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- F. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).
- G. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).
- H. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. MPI product number (e.g., MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Fuller and D'Angelo, P.C. before preparing samples, to eliminate sheens definitely not required.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for YPS Office of Facilities Management's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 10 years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience.

1.8 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide door and frame assembly illustrating paint color, texture, and finish.
- C. Locate Where directed by the [].

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.10 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. Substitutions: Refer to Section 01 2500 - Substitution Procedures..
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
 - 2. Primer Sealers: Same manufacturer as top coats.
- C. Substitutions: 01 2500 - Substitution Procedures..

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Fuller and D'Angelo, P.C. from the manufacturer's full line.
- E. Colors: As indicated in Finish Schedule.

2.3 PAINT SYSTEMS - INTERIOR

- A. Concrete/Masonry, Opaque, Latex, Three coats: (New surfaces)
 - 1. Block Filler: One Coat Spreading rate recommended by manufacturer to achieve a dry film thickness of 16 mils wet; 7.7 mils dry

- a. Sherwin Williams Super PrepRite Block FillerCraft No. 285.
2. Topcoat: Two Coats latex enamel spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.3 mils dry.
 - a. Sherwin Williams ProMar 400 Zero VOC Semi-Gloss
- B. Concrete/Masonry, Opaque, Latex, 2 coat: (Existing surfaces)
 1. Latex Primer Sealer: One Coat latex enamel spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.3 mils dry..
 - a. Sherwin Williams Multi-Purpose Interior Exterior Latex Primer EW
 2. Topcoat: Semi-gloss: One coat of latex enamel.
 - a. Sherwin Williams ProMar 400 Zero VOC Semi-Gloss
- C. Ferrous metals, Not Primed, Acrylic Latex, 3 coat:
 1. One Coat latex primer spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 5.6 mils.
 - a. Sherwin Williams Direct-to-Metal Semi-Gloss.
 2. Topcoat: Three coats Acrylic Latex
 - a. Sherwin Williams ProMar 400 Zero VOC Semi-Gloss
- D. Ferrous metals, Primed, Acrylic Latex, 2 coat:
 1. Touch up with latex primer.
 2. Two Coats Acrylic Latex spreading rate recommended by manufacturer to achieve a dry film thickness of 4 mils wet; 1.3 mils dry to 5.6 mils:
 - a. Sherwin Williams ProMar 400 Zero VOC Semi-Gloss

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Fuller and D'Angelo, P.C. of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Plaster and Stucco: 12 percent.
 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 4. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
 - 1. Prior to removing mildew, test any cleaner on a small, inconspicuous area prior to use.
 - 2. Bleach and bleaching type cleaners may damage or discolor existing paint films. Alternative cleaning solutions may be required
 - 3. Wear protective eye wear, waterproof gloves, and protective clothing.
- F. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Clean concrete according to ASTM D4258. Allow to dry.
 - 3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I.
- J. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- K. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- L. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and SSPC-SP 3. Protect from corrosion until coated.
- M. Cleaning Existing Walls: Remove all loose paint, plaster and other coatings.
 - 1. Working from bottom to top, apply prepared cleaning solution to a dry surface.
 - 2. Leave solution on the surface for 5-20 minutes. If solution begins to dry, reapply.
 - 3. Gently scrub heavily soiled areas.
 - 4. Rinse thoroughly with clean water with by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip.
 - 5. Apply after wash. Let the Afterwash stay on the surface for three to five minutes.
 - 6. Pressure rinse from the bottom of the treated area to the top.
- N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Sand metal surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Room and Corridor Door signs.

1.3 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls for temporary Project identification signs and for temporary information and directional signs

1.4 REFERENCE STANDARDS

- A. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - 2. Submit for approval by YPS Office of Facilities Management and Fuller and D'Angelo, P.C. prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- G. Manufacturer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
- B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Store tape adhesive at normal room temperature.

1.8 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: 5 years years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PANEL SIGN

- A. Manufacturers
 - 1. Flat Signs:
 - a. Crown Signs, 4 Executive Plaza, Yonkers, NY 10701; (914) 375-2118.
 - 2. Substitutions: Section 01 2500 Substitution Procedures.
- B. Manufacturer's standard monolithic tactile plaque constructed utilizing a thermoforming process, which provides a fully homogeneous plaque sign. The sign body, face, raised text and Braille are compression molded to form a single dimensional component that results in a sign surface that exhibits a toughness that resists scratching, cracking, gouging and graffiti.
 - 1. Style: Identification: Photopolymer Signs with raised lettering is physically attached, not laminated to the face plate.
 - a. Sign to be satin Braille and pictograms raised. "Tipping" shall be provided where just the tips or the raised areas are finished providing an extra layer of protection to the sign and paint.
 - b. Provide VHB Tape, holes drilled/countersunk for mounting, radius corners, and back plates.
 - 2. Material: Extruded Engineered PVC/Acrylic alloy with Integral background colors and high impact resistance with Class A Fire Rating.
 - 3. Frame: Plastic:
 - a. Thickness: 3/8 inch (3mm).
 - b. Edge Treatment:
 - a) Standard 0.5" Radiused Corners.
 - c. Color: As Selected by Architect from manufacturer's standards
 - 4. Lettering/ Tactile Characters/Symbols: Integral Raised 1/32 inch (1 mm) from sign plate face.
 - a. Helvetica Med
 - 5. Lettering Style: Typeface as selected from the manufacturer's standard typefaces, upper case letters as indicated on drawings.
 - 6. Braille: Grade 2 braille, placed as indicated on drawings
 - a. Integral raised, painted to match background.
 - 7. Contrast: Letters, numbers and symbols shall contrast with background.
 - 8. Inserts as indicate on signage types shown on drawings.
 - a. 1/16" photopolymer , mounted in frame w/ snap locks.
 - b. Text: integral raised & tipped Black or As selected from standard colors to match existing..
 - c. Mounting: Snap locks.
 - 9. Color of Background: As selected from manufacturer's standard background colors to match existing..
 - 10. Color of Text and Raised Characters: Black
 - 11. Surface Texture: Matte

C. Materials

1. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
 - a. Self-extinguishing material engraving stock with face and core piles in contrasting colors, in finishes and color combinations indicated or, if not indicated, as selected from the manufacturer's standard.

2.2 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
 1. Flame Spread: Less than 25.
 2. Smoke Development: Less than 450
- B. Room and Door Signs: Refer to schedule on drawings.
 1. Sign Type: Flat signs with engraved panel media as specified.
 2. Provide "tactile" signage, with letters raised minimum 1/32 inch (0.8 mm) and Grade II braille.
 3. Character Height: As shown on drawings.
 4. Sign Height: As shown on drawings.
 5. Total Frame depth: 3/8 inch.
 6. Name slot height: 5/8 inch.
 7. Classroom and Office Doors: Identify with As shown on drawings.; in addition, provide "window" section for replaceable occupant name.
 8. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
 9. Rest Rooms: Identify with pictograms, the names as shown on drawings and braille.
- C. Provide for locations and rooms as scheduled and shown on drawing. **In addition to those indicated on drawings provide:**
 1. Ten (10) type 'A' signs.
 2. Ten (10) type 'AA' signs.
 3. Ten (10) type 'D' signs .

2.3 ACCESSORIES

- A. Concealed Screws: Security type Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. All signs to be mechanically fastened and taped.
- C. Install neatly, with horizontal edges level.
- D. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

3.3 SIGNAGE SCHEDULE

- A. Refer to drawings

END OF SECTION

SECTION 10 2113
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Solid polymer toilet compartments. (HDPE Toilet Partitions and NFPA 286 certification)
- B. Urinal costume screens. NFPA 286

1.3 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry.
- B. Section 10 2800 - Toilet And Bath Accessories.
- C. Section 22 0300 Plumbing Fixtures and Equipment.

1.4 REFERENCE STANDARDS

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- C. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials
- D. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Installer's Qualifications: A Company or Individual, regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.
- C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.
- D. Performance Requirements:
 - 1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84:
 - a. Class A flame spread/smoke developed rating.
 - 2. Material Fire Ratings:
 - a. National Fire Protection Association (NFPA) 286: Pass.
 - b. International Code Council (ICC): Class B.

1.6 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.7 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
- C. Samples: Submit two samples of partition panels, 3 x 3 inch (____ by ____ mm) in size illustrating panel finish, color, and sheen.
- D. Sustainable Design Submittals:
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer and extraction or harvest point in miles
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Manufacturer's guarantee.

1.8 WARRANTY

- A. Manufacturer's guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Scranton Products; Hiny Hiders Partitions: 801 E. Corey St.; Scranton, PA 18505; Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email; info (info@scrantonproducts.com); Web:www.scrantonproducts.comwww.scrantonproducts.com.
 - 1. Substitutions: Refer to 01 2500 Substitution Procedures.

2.2 MATERIAL

- A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.
 - 1. Recycled Content; Post Industrial: 25 percent Minimum
- B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.
- C. Stainless Steel Castings: ASTM A167, Type 304.
- D. Aluminum: ASTM B221, 6463-T5 alloy.

2.3 PLASTIC TOILET COMPARTMENTS

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted unbraced.
 - 1. Color: As indicated on the Finish Schedule..
- B. Doors:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Width: 24 inch (610 mm).
 - 3. Width for Handicapped Use: 36 inch (915 mm), out-swinging.
 - 4. Height: 55 inch (1397 mm).
 - 5. Aluminum heat sink fastened to bottom edges
- C. Panels:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Height: 55 inch (1397 mm).

3. Depth: As indicated on drawings.
- D. Pilasters: Pilasters shall be 81-1/2" high finished height. Pilasters shall include a mounting system comprised of a one piece 20 gauge, 304 stainless steel with #4 finish 3" high shoe with an integral plate in the bottom secured to pilasters with a stainless steel tamper resistant Torx head sex bolt. The shoe shall be mounted to the floor utilizing concrete anchors supplied by Manufacturer or equal. The concrete anchors shall be driven through the plate affixing it to the concrete floor. The concrete anchors shall have 2,700 lbs of holding strength when used in 5,000 psi concrete flooring. The pilaster height shall be adjusted by utilizing the machine thread bolt supplied which is placed into a metal insert installed in the bottom of the pilaster at the manufacturing facility.
- E. Urinal Screens: Custom to match compartments; mounted to wall with continuous Heavy duty Aluminum 6463-T5 alloy panel brackets .
 1. Provide screen with one piece pedestal leg.
 2. Aluminum heat sink fastened to bottom edges.
 3. Height: 56".
 4. Width: 18".
 5. Wall Brackets:

2.4 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches (76 mm) high; concealing floor fastenings.
 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Extruded aluminum, anti-grip profile secured to pilaster with stainless steel tamper resistant Torx head sex bolt.
 1. Size: Manufacturer's standard size.
- C. Wall Brackets: Continuous aluminum brackets, heavy-duty aluminum 6463-T5 alloy.
 1. Use for all wall attachment for partitions and screens.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hinges: Anodized aluminum; satin finish.
 1. Continuous-type hinge, self closing.
 2. Length: 54 inches.
- F. Door Hardware: Anodized aluminum, manufacturer's standard finish.
 1. Door Latch: Slide type with exterior emergency access feature.
 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
 3. Provide door pull for outswinging doors.
 4. Equip outswing handicapped doors with second door pull and door stop
- G. Coat Hook with Rubber Bumper: One per compartment, mounted on door, chrome plated Zamak.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.
- D. Start of work constitutes acceptance of job.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

- B. Maintain 1/4 inch to 1/4 inch (10 mm to 10 mm) space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- F. All panels shall typically be mounted at 14" above finished floor
- G. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch (6 mm).
- B. Maximum Variation From Plumb: 1/8 inch (3 mm).

3.4 ADJUSTING/CLEANING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.
- D. Finished surfaces shall be cleaned after installation and be left free of all imperfections.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Remove factory protective coverings and clean finish surfaces in accordance with manufacturer's instructions before substantial completion.

END OF SECTION

SECTION 10 2800
TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Grab bars.
- B. Mirror Units.
- C. Double Roll Toilet Tissue Dispenser. (Provided by Owner Installed by Contractor).
- D. Liquid Soap Dispenser. (Provided by Owner Installed by Contractor).
- E. Lavatory protective enclosure.
- F. Paper Towel Dispenser. (Provided by Owner Installed by Contractor).
- G. Partition Mounted Sanitary Napkin Disposal.
- H. Semi-Recessed Sanitary Napkin/Tampon Vendor

1.3 RELATED REQUIREMENTS

- A. Section 10 2113 - Plastic Toilet Compartments.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip; 1999 (Reapproved 2009).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
- I. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2015.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- K. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.6 WARRANTY

- A. Warranty: Contractor shall provide a warranty for two (2) years after the date of Substantial Completion of the Contractor's work or designated portion thereof.
- B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.
 - 1. Minimum Warranty Period: 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Bobrick Washroom Equipment, Inc.. www.bobrick.com.
- B. Substitutions: Refer to Section 01 2500 - Product Requirements
- C. Under-Lavatory Pipe Supply Covers:
 - 1. Truebro LavShield.
 - 2. Substitutions: Refer to Refer to Section 01 2500 - Product Requirements.
- D. Substitutions: Section 01 2500 - Product Requirements.
- E. Provide products of each category type by single manufacturer.

2.2 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide two (2) keys for each accessory to Yonkers Public Schools; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.3 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

2.4 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted, for coreless type rolls.
 - 1. Provided by Owner Installed by Contractor.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
 - 1. Products:
 - a. Furnished by Owner Installed by Contractor..

- C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, tumbler lock.
 - 1. Owner supplied Contractor install.
- D. Mirror: Stainless steel, 18-8 stainless steel, type 304, 20 gauge with No8 mirror finish.
 - 1. Stretcher leveled stainless steel with reflective, highly polished strip finish. Tempered Masonite backing.
 - 2. Size: 18" x 30".
 - 3. Frame — 18-8 S, type-304, heavy-gauge stainless steel, 3/4" x 3/4" (19 x 19mm) angle with vertical-grain satin finish. Onepiece, roll-formed construction forms continuous integral stiffener on all sides. Bevel design on front of angle holds frame tightly against mirror. Corners are welded, ground, and polished smooth. Galvanized steel back is fastened to frame with concealed screws and equipped with integral horizontal hanging brackets. Concealed Phillips-head locking screws securely fasten mirror to wall hanger(s).
 - 4. Backing: 1/4" (6mm) thick tempered water resistant masonite
 - 5. Products:
 - a. Model #B-2906 manufactured by Bobrick.
- E. Grab Bars: Stainless steel, smooth surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum to meet and exceed ADA requirements.
 - b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.
 - e. Snap-On Flange Covers, shall be 22 gauge for concealed mounting, type 304 stainless steel alloy 18-8.
 - f. Products:
 - a) B-5806 Series manufactured by Bobrick.
- F. Combination Sanitary Napkin/Tampon Dispenser: Stainless steel, semi-recessed.
 - 1. Door: Seamless 18-gauge (1.2mm) stainless steel with satin finish door with returned edges and tumbler lock.
 - 2. Cabinet: Fully welded, 18-8, Type-304, 18-gauge (1.2mm) stainless steel.
 - a. Secured to cabinet with a concealed full-length stainless steel piano-hinge.
 - b. Equipped with two tumbler locks keyed like.
 - c. Graphic symbols identify products dispensed and coin denomination.
 - 3. Operation: No charge; no coin slots.
 - 4. Identify dispensers slots without using brand names.
 - 5. Minimum capacity: 30 napkins and 27 tampons.
 - 6. Products:
 - a. B-47064C Semi-Recessed Free no-coin operation manufactured by Bobrick.
- G. Sanitary Napkin Disposal Unit: Partition, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
 - 1. Capacity: 1.5 gallon.
 - 2. Unit shall be 22 gauge type 304 stainless steel alloy 18-8 with satin finish and shall have contoured cover finger lift relief and be protected during shipment with PVC film.

3. Full top door shall be 22 gauge type 304 stainless steel alloy 18-8 with satin finish and shall be attached to the cabinet at back with a concealed full-width 9/64" dia. meter heavy-duty stainless steel multi-staked piano hinge spring loaded.
4. Structural assembly of body and door components shall be of welded construction and shall have no exposed fastening devices or spot-welded seams
5. Receptacle: Removable waste container shall be captured internally by full width - retainer and shall have a safety-edged finger grip.
6. Product: #B-354 manufactured by Bobrick.

2.5 UNDER-LAVATORY PIPE AND SUPPLY COVERS

- A. Under-Lavatory Pipe and Supply Covers:
 1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
 2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
 3. Construction: 1/8 inch (3.2 mm) flexible PVC.
 - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - b. Microbial and Fungal Resistance: Comply with ASTM G21.
 4. Color: White.
 5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
 6. Products:
 - a. Lav-Shield manufactured by Truebro, Inc..

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.
- E. See Section 06 1000 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 7500
FLAGPOLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Aluminum Flagpoles.
- B. Flags.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete base and foundation construction.
- B. Section 31 2316 - Excavation.
- C. Division 26 for Electrical requirements.

1.4 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2016.
- C. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles; 2007.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads stamped and signed by New York State professional engineer.
- D. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads .
- E. Samples: Submit two samples, 12 by 12 inch (300 x 300 mm) in size, illustrating pole material, color, and finish.
- F. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules and _____.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed State of New York .
- B. Lateral design loads - footing and anchorag design to resist lateral loads.
- C. Vertical design loads - footing design to resist vertical loads,
 - 1. Ensure proper soil bearing resistance.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- B. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Flagpoles:
 - 1. Concord American Flagpole, Model IRW35071, Addison, TX 75001, 1.800.527.3902.
 - 2. Substitutions: Section 01 2500 Substitution Procedures.

2.2 FLAGPOLES

- A. Flagpoles: Designed in accordance with NAAMM FP 1001.
 - 1. Material: Aluminum.
 - 2. Design: Tapered.
 - 3. Mounting: Ground Set.
 - 4. Outside Butt Diameter: 7 inches (175 mm).
 - 5. Outside Tip Diameter: 3.5 inches (87.5 mm).
 - 6. Nominal Wall Thickness: 0.188 inches (4.7 mm).
 - 7. Nominal Height: 35 ft (114.8 m); measured from nominal ground elevation.
 - 8. Halyard: Interior type .

2.3 POLE MATERIALS

- A. Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.4 ACCESSORIES

- A. Finial Gold Ball: Aluminum, 8 inch (200 mm) diameter with quad lights.
 - 1. Model ABW4-354P-Satin.
- B. Truck Assembly: Stainless steel; revolving, stainless steel ball bearings, non-fouling.
- C. Flag: US Design design, 8 ft by 12 ft (2.4 m by 3.7 m) size, nylon fabric, brass grommets, hemmed edges.
- D. Truck Assembly: Revolving.
- E. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.
- F. Halyard: 1-5/8 inch (____ mm) square plate stainless steel
- G. Counterbalance: as per manufacture's standard.

2.5 OPERATORS

- A. Winch, gearless stainless steel. 1.800.527.3902
 - 1. Direct drive.
 - 2. Access: behind locked door, flush mounted.
 - 3. Removable handle.

2.6 MOUNTING COMPONENTS

- A. Pole Base Attachment: Tube; 16 ga. galvanized, aluminum base with base cover..
- B. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

2.7 FINISHING

- A. Concealed Steel Surfaces: Galvanized to ASTM A123/A123M requirements.
- B. Aluminum: Anodized to _____, color as selected.
- C. Finial: Spun finish.

2.8 WARRANTY

- A. Pole Shaft: Manufacturer will, upon shipment warrants that the pole shaft shall, be free from defects in material and workmanship and to be free from corrosion.
 - 1. Warranty Period: Lifetime.
 - 2. Manufacturer shall provide separate warranties for its anodized and powder coated finishes and for hardware and other flagpole accessories

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.2 PREPARATION

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.3 INSTALLATION

- A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.
- B. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1 inch (25 mm).

3.5 ADJUSTING

- A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

SECTION 22 0100

GENERAL CONDITIONS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 GENERAL CONDITIONS

- A. Before submitting a proposal, Bidders shall examine all Drawings related to this work and shall become fully informed as to the extent and character of the work required and its relation to the other work in the building.
- B. Before commencing work, the Contractor will examine all conditions of the project upon which his work is in any way dependent for perfect workmanship according to the intent of this Specification. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed by this Contractor and acceded to by the Owner's representative in writing before the Contractor begins any part of the work.
- C. The Contractor will pay for all licenses, permits and inspection fees required by civil authorities having jurisdiction. Comply with all laws, ordinances, regulations, fire Underwriters requirements applicable to work herein specified without additional expense to the Owner. (Also, local building code requirements.).
- D. It is specifically intended that anything (whether material or labor) which is usually furnished as a part of such equipment as is hereinafter called for (and which is necessary for the completion and proper operation) shall be furnished as part of this Contract without additional cost the Owner, whether or not shown in detail on the Drawings or described in the Specifications.
- E. When Drawings and Specifications conflict or there is a question as to the proper intent of this Contract, the Contractor shall assume the more expensive method in his pricing. All questions shall be directed to the Architect/Engineer in writing only and only up to ten (10) days prior to bidding.
- F. The Drawings indicate the general runs of the piping, ductwork, etc. systems and the location of equipment and apparatus, but it shall be understood that the right is reserved by the Architect/Engineer to change the location of piping work, ductwork, equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.
- G. Small scale drilling through walls and floors which may contain asbestos shall be performed by a person with a "restricted asbestos handler allied trades certificate" and shall have a copy of it in his possession at all times while working on the project.
- H. Any changes from the Drawings and Specifications and any interpretation thereof shall have the prior approval of the Architect/Engineer. The Contractor shall submit in writing, at the time of signing the Contract, any items of necessary labor and materials, which, in his opinion, are lacking in requirements of the Drawings and Specifications to insure a complete job in all respects. No consideration will be granted to alleged misunderstanding of materials to be furnished, work to be done, or conditions to be complied with, it being understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein or indicated on the accompanying Drawings.

END OF SECTION

SECTION 22 0125

SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 SCOPE OF WORK

- A. The work under this section includes all labor, materials, equipment, tools, transportation, cutting and patching, excavation and backfill and the performance of all work necessary and required for the furnishing and installation complete of all Plumbing and Drainage work as shown on Contract Drawings, as specified herein and as otherwise required by job conditions or reasonably implied, including but not necessarily limited to the following:
1. Provide complete new and altered sanitary, storm, and vent piping from all new plumbing fixtures connecting to existing sanitary and vent system. See front end spec for bedding requirements.
 2. Provide complete new and altered hot and cold water piping to all new plumbing fixtures, equipment, etc. as indicated.
 3. Provide all new plumbing fixtures where indicated, complete including traps, stops, drains, strainers, tailpieces, faucets, escutcheons, etc.
 4. Provide transformer and wire to auto-faucets and flush valves for complete installation connect to junction box by Electrical Contractor. Select proper transformer based on number of fixtures. All low voltage wiring by Plumbing Contractor. Furnish access door of proper size for GC to install. Coordinate with Electrical Contractor and General Contractor.
 5. Provide complete new piping and final connections to equipment furnished under other Divisions.
 6. Provide all demolition, removal disconnecting, capping, sealing of all existing plumbing piping, apparatus, equipment, fixtures, specialties, accessories, etc. which are not included or incorporated in the new layout.
 7. Provide all required temporary connections to maintain all plumbing services without interruption.
 8. Pipe insulation.
 9. Tests and adjustments.
 10. This Contractor shall obtain all permits, bonds, approvals, etc. at no additional cost to the Owner.
 11. This Contractor shall provide shop drawings for all plumbing fixtures, piping, valves, insulation, equipment, etc.
 12. Furnish minimum 18" x 18" access doors for all valves, cleanouts, etc. in all inaccessible walls, ceilings, etc. Installation by General Contractor.
 13. Cutting and Patching: See Front End Specifications for Trade Responsibilities.
 14. Excavation and Backfill: See Front End Specifications for Trade Responsibilities.
 15. Fire stopping per FM/UL and NFPA. Refer to Division 1.

- B. Coordination Drawings: Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of any and all claims for either or both "time" and "money".

1.2 ALTERATION WORK

- A. All equipment, piping, plumbing, fixtures, etc. to be removed, shall be disposed of or salvaged as directed by the Owner. They shall not be removed from the premises without Owners approval.
- B. All piping to be removed shall be properly plugged or capped so that upon completion of all new work, all abandoned piping shall be concealed in finished areas.
- C. No dead ends shall be left on any piping upon completion of job.
- D. The existing systems shall be left in perfect working order upon completion of all new work.
- E. Location and sizes of existing piping are approximate. Exact sizes and locations of all existing piping shall be verified on the job.
- F. All removals shall be removed from the site.

END OF SECTION

SECTION 22 0130

WATER SUPPLY SYSTEM

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. Furnish and install a complete cold-water distribution system to supply water to all new fixtures, water consuming equipment, and valved outlets for the use of other trades and connect to existing piping.
- B. The water supply system shall be complete with all pipe, fittings, valves, mains, risers, branches, shock absorbers, air chambers, hangers, anchors, expansion loops, connections to existing piping, covering, tests, etc. all as shown on the Drawings, as hereinafter specified.
- C. Furnish and install a complete hot water distribution system to supply water to all new fixtures and equipment requiring heated water.

PART 2 - PRODUCTS

2.1 PIPING, FITTINGS AND MATERIALS

- A. All components of water supply system shall confirm to all "No Lead" requirements including NSF/ANSI-372.
- B. The domestic water systems shall be of the following material and shall be in accordance with the latest ASTM and ASME Standards.
- C. Domestic water piping within the buildings shall be seamless drawn or extruded tubing type "L" copper. Both shall be of Chase, Anaconda, Revere, and approved equal, hard temper ASTM B88 with solder joint sweat end fittings. Fittings for use with copper tubing shall be cast brass of Muellers "Streamlin" pattern or approved equal.
- D. Joints for copper tubing shall be made with 95-5 (lead and antimony free) solder. Flanges where required shall be cast brass. Provide dielectric adapters between ferrous and non-ferrous pipe joints.

2.2 VALVES

- A. All shut-off valves 2" and smaller shall be ball valves equal to Apollo 70 Series or Milwaukee BA100 Series Valve. Bronze body with chrome plated trim
- B. This Contractor shall furnish all valves as indicated on the Drawings, or as may be required for the proper control of the pipe lines installed under this Specification, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the Facility.
- C. All domestic water valves shall have a minimum working pressure of 125 psig, steam rated unless otherwise noted on the Drawings or specified herein. All valves shall be of one manufacture as manufactured by Milwaukee Valve or Hammond.
- D. All gate valves within the buildings shall be wedge gauge valves with painted iron wheel handles, shall have gland followers in stuffing boxes, and shall be so constructed that they may be repacked while open and under pressure. All valves shall have the name of the manufacturer and working pressure cast or stamped thereon.

- E. All gate valves shall be all bronze with sweat or screwed joint ends as required by the piping system in which they are installed.
- F. Globe valves shall be of all bronze with composition disc, threaded or sweat joint ends as required by piping system in which they are installed.
- G. Check valves shall be all bronze swing check type with threaded or sweat joint ends. Check valves 4 inch and larger shall be iron body bronze mountings and shall be provided with screwed or flanged joint ends as required by piping system in which they are installed.
- H. Drain valves, at risers and at low points, shall be 3/4 inch heavy cast brass with composition washers with male thread for hose connections.

2.3 SHOCK ABSORBERS

- A. Shock absorbers shall be similar and equal to J.R. Smith 5000 series or Zurn Z1700 series with stainless steel pressurized shell sized in accordance with P.D.I. Bulletin WH-201.
- B. Provide shock absorbers on all fixtures and equipment having quick closing valves whether or not indicated on the Drawings.
- C. Provide access doors where shock absorbers are concealed.

2.4 VACUUM BREAKERS

- A. Provide vacuum breakers on water supply piping to each fixture and equipment with submerged inlets, and on faucets and outlets, within the facility to which hose can be, or is attached forming a submerged inlet.
- B. Set vacuum breakers in exposed readily accessible locations at least four inches above floor rim level of fixture, or high point of equipment.
- C. Vacuum breakers shall be chrome-plated brass. "Watts" or other approved.
- D. Vacuum breakers under constant pressure shall be of the continuous pressure type No. 9 "Watts" or Wilkins BFP-8CH or approved equal.

2.5 EXPANSION JOINTS, ANCHORS AND GUIDES

- A. The entire piping installation shall be installed with adequate provision for expansion. No rigid connections will be permitted. Refer to Drawings for locations of expansion joints and related guides and anchors. The joints, guides and anchors shall be as manufactured by Flexonics Products, Metraflex or Flex-weld.
- B. Branches shall be of sufficient length and have three elbow swings to allow for pipe expansion.
- C. Any breaks in the piping within the guarantee period due to improper provision for expansion must be replaced at the expense of this Contractor, and the conditions corrected to prevent future recurrence.
- D. Any damages to surrounding areas and equipment due to this failure shall also be repaired and paid for at the expense of this Contractor.
- E. Joints to have 150 psi rating, ANSI-B16.5 with liner and cover.

2.6 STERILIZATION

- A. The entire domestic water piping system shall be thoroughly sterilized with chlorine before acceptance for domestic operation.
- B. The amount of chlorine applied shall be such as to provide a dosage of not less than 50 parts per million for 24 hours or 200 p.p.m. for one hour. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution and shall be introduced into the system and drawn to all points of the system. If possible to do so, the lines shall be thoroughly flushed before introduction of the chlorinating material. After a contact period of not less than 24 hours, the system shall be flushed with clean water until the residual content is not greater than 0.2 parts per million. All valves in the lines being sterilized shall be opened and closed several times during the contact period.
- C. Sterilization and tests for purity of water in the entire piping system shall be performed by the Contractor through an approved independent testing laboratory and a certificate shall be furnished to the Architect certifying the quality of purity.
- D. Per ANSI/AWWA Standard C651-15.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. It is the intent that each part of the plumbing system shall be complete in all details and water lines provided with all control valves as indicated on Drawings, or as may be required for the proper control of the pipe lines under this Specification so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the facility.
- B. This Contractor shall carefully examine the Architectural Drawings in detail and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.
- C. In no case shall this Contractor permit his pipes to be exposed beyond finished walls or ceilings unless specifically shown on Drawings. He shall consult with the Contractors of other trades in the building and install his piping in such a way as to least interfere with the installation of other trades.
- D. The water piping shall all be installed so as to drain to a valve provided by this Contractor and branches shall not be trapped but shall have continuous pitch. Where necessary to raise or lower mains, the same shall be provided with a drip and shall be properly valved.
- E. Piping shall be installed, whether indicated or not, so as to rise and/or drop to clear any and all conduits, lighting fixtures, ductwork and heating mains to maintain the desired clear heights. This Contractor shall consult with the Contractors of other trades and facilitate the erection of the equipment and piping.
- F. Run piping straight and as direct as possible, in general forming right angles with or parallel to walls or other piping. Risers shall be erected plumb and true.
- G. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.
- H. No piping or work shall be concealed or covered until all required tests have been satisfactorily completed and work has been approved by the Architect.
- I. All materials shall be new and installed in a first class manner.

- J. In erecting pipe, friction wrenches and vises shall be used exclusively, and any pipe cut, dented or otherwise damaged shall be replaced by this Contractor.
- K. All ferrous to non-ferrous pipe connections shall be made with approved dielectric pipe or flange unions isolating joints to prevent any electrolytic action between dissimilar materials.
- L. Any piece of pipe 6 inches in length or less shall be considered a nipple. All nipples with unthreaded portion 1-1/2 inch and less shall be of weight corresponding to fitting connected. Only shoulder nipples shall be used, close nipples will not be accepted.
- M. Revised water service shall be in accordance with the local water supply department requirements. All water lines are to be protected from freezing. Install new piping for water service below frost line and provide concrete separations when crossing other utilities. Provide concrete thrust mass at changes of pipe direction conforming to authorities having jurisdiction.

END OF SECTION

SECTION 22 0160

SANITARY AND STORM DRAINAGE SYSTEMS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. The work under this section includes all labor, materials, equipment and appliances necessary and required to completely install all drainage systems as required by the Drawings; code and as specified herein, including but not limited to the following:
- B. Complete sanitary drainage and venting systems including connections to the existing sanitary drainage and venting systems.
- C. Piping and final connections for equipment furnished under other Divisions.
- D. Alterations and removals to existing sanitary and vent systems.
- E. Tests.

1.2 QUALITY ASSURANCE

- A. All Cast Iron soil pipe and fittings shall bear the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
- B. Hubless Couplings:
Standard, Stainless-Steel Shielded, Couplings: Standard Couplings shall conform to CISPI 310 and ASTM C 1277. Shield Assemblies shall consist of a stainless steel bi-directional corrugated shield; stainless-steel bands and tightening devices; and an ASTM C 564, rubber sleeve with integral center stop. Couplings shall bear the NSF Trademark, and be manufactured in the USA.

PART 2 - PRODUCTS

2.1 PIPING AND FITTING MATERIALS

- A. All indoor underground storm soil, waste and vent piping shall be service weight cast iron with fittings of bell and spigot type. All exterior underground storm soil and waste piping shall be extra heavy cast iron. Each length shall have the size, weight per foot and the manufacturer's name clearly cast or stamped thereon. Weight shall be as defined by the Plumbing Code. Fittings and traps shall be similarly marked and of corresponding weights.
- B. All above ground storm, soil, waste and vent piping and fittings 3" and larger shall be service weight and fittings of bell and spigot type as specified in paragraph above. Above ground waste and vent piping 2" and smaller shall be galvanized steel, fittings on waste piping shall be galvanized cast iron, recessed drainage pattern, fitting on vent piping shall be galvanized cast iron, beaded pattern, screwed joints shall be made up to be perfectly tight without the use of lead or filler of any kind, except oil or graphite. Nipples for galvanized pipe shall be shoulder type. No close nipples shall be permitted.

- C. Joints shall be made with gasket or hemp or picked oakum and lead, at least 12 oz. of fine soft pig lead shall be used for each inch of diameter pipe used. Lead shall be run in one (1) pouring. All lead shall be pure and soft and of the best quality and shall be sufficiently heated to run joint full at one pouring without hardening. Dross shall not be allowed to accumulate in the melting pot. See 2.1, E. for joint options where permitted.
- D. All galvanized pipe and fittings shall be galvanized with prime western spelter by hot drip process.
- E. The Contractor has the option of using the following types of joints with hubless cast iron pipe only if approved by the governing agencies. These joints shall be used throughout the project. No mixing of joints shall be permitted.
 - 1. Neoprene gasketed joints similar to Ty-Seal (for above and underground application).
 - 2. Hubless cast iron pipe with neoprene gaskets and stainless steel clamps (by Clamp-All or equal) above ground only. All in accordance with Cast Iron Soil and Pipe Institute Standard 301 latest edition. Hangers and supports shall be in accordance with manufacturer's recommendations.
 - 3. Copper DWV system with 50-50 tin antimony solder, DWV with solvent welded or screwed joints meeting CS-270-65.

2.2 CLEANOUTS

- A. Provide easily accessible cleanouts where indicated at base of vertical stacks at ends of horizontal drainage lines and at intervals not exceeding 50 ft.; at each change of direction; on handholes of running traps, and where necessary to make entire drainage system accessible for rodding. Provide at least 18" clearance to permit access to cleanout plugs.
- B. Cleanouts for cast iron pipe shall consist of tarpped extra heavy cast iron ferrule caulked into cast iron fittings and extra heavy brass tapered screw plug with solid hexagonal unit. Cleanouts for wrought iron pipe shall consist of extra heavy brass screw plug in drainage fitting.
- C. Cleanouts turning out through walls and up through floors shall be made by long sweep ells or "Y" and 1/8 bends with plugs and face or deck plates to conform to Architectural finish in the room. Where no definite finish is indicated on the Architectural and/or Mechanical Drawings, wall plates shall be chrome plated cast brass and floor plates shall be nickel bronze.
- D. Cleanouts shall be full size at the pipe up to 6" inclusive. On larger size piping 6" size plugs shall be used.
- E. Cleanout fittings in vertical stacks shall consist of tapped tees capable of receiving a rough brass raised head cleanout plug, J.R. Smith S-4730, Zurn Z1445-A-BP or approved equal.
- F. All cleanout plugs shall be brass lubricated with graphite before installation.
- G. Cleanouts occurring in cast iron soil pipe above floor at change of direction of pipe run and at ends of horizontal runs shall be J.R. Smith S-4425, Zurn Z1441-A-BP or approved equal with cast iron ferrule for caulk connection and fitted with a straight threaded tapered bronze plug with raised hex head.
- H. Cleanout deck plates for finished areas shall be similar and equal to J.R. Smith 4020 series, Zurn ZB1400-X or approved equal with cast iron ferrule, scoriated cutoff sections, brass cleanout plus collar with brass bolts for waterproofed slabs. In tile floor areas the cleanout deck plates shall be recessed to tile.

2.3 FLASHING

- A. Provide 6 lb. lead flashing extending at least 10" beyond edge of all floor drains and vents through roof and all floor sleeves in floors with waterproofing or vapor barriers. Flashing shall be held securely in by clamping devices.
- B. All floor drains shall be provided with flashing rings and 24" square 6 lb. sheet lead flashing, properly flashed into flashing ring of the drain.

2.4 SANITARY DRAINAGE

- A. A complete system of drainage shall be provided as shown on the Drawings. The system shall include all drains, leaders, branches, house drains with all pipe fittings, hangers, anchors, etc. to make a complete sanitary drainage system. The systems shall extend through house drains and terminate as indicated on the Drawings.
- B. Piping shall be sizes as indicated on the Drawings. The sanitary drains shall have a pitch of 1/8" per ft. minimum unless otherwise noted. Branch connections to stacks and house drains shall pitch a minimum of 1/8" per ft.

2.5 PIPING AND FITTINGS

- A. Provide piping of one of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING

- A. The size of soil, waste and vent piping shall be as determined by the State codes, rules and regulations for plumbing and drainage, except where specifically noted to be larger by the Specifications or Drawings and all fixed rules of installation, as set forth in the codes, rules and regulations, shall be followed as part of the Specifications.
- B. This Contractor shall carefully examine the Architectural plans in detail and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.
- C. In no case shall this Contractor permit his pipes to be exposed beyond finished plaster lines unless specifically shown on Drawings. He shall consult with the Contractors of other trades in the building and install his piping in such a way as to least interfere with the installation of other trades.
- D. Piping shall be installed, whether indicated or not, so to rise and/or drop to clear any and all conduits, lighting fixtures, ductwork and heating mains to maintain the desired cleat heights. This Contractor shall consult with the Contractors of other trades and facilitate the erection of the equipment and piping.
- E. Run piping straight and as direct as possible in general forming right angles with or parallel to walls or other piping. Risers and stacks shall be erected plumb and true. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.
- F. No piping or work shall be concealed or covered until all required tests have been satisfactorily completed and work had been approved by the Architect and all other authorities having jurisdiction.

SANITARY AND STORM DRAINAGE SYSTEMS

- G. Branch connections shall be made with "Wye" and long "Tee-Wye" fittings, short 1/4 bends, common offsets and double hubs will not be permitted. Short "Tee-Wye" fittings are to be used in vertical piping only. All fittings shall conform to code requirements.
- H. Cleanouts shall be provided at foot of all stacks, at changes of directions, at the ends of branch runs where shown and as required by code and shall be terminated as described under cleanouts.
- I. The house drains must be run at a minimum grade of 1/8" per ft. downward in the direction of flow. Wherever possible, a 1/4" per ft. pitch shall be maintained. Branch connections to stacks from fixtures shall pitch 1/4" per ft. where possible. Attention is again called to the necessity of maintaining the ceiling heights established.
- J. Furnish and install complete systems of vent pipes from the various plumbing fixtures and other equipment to which drainage connections are made. Vent pipes shall be connected to the discharge of each trap and shall be carried to a point above the ultimate overflow level of the fixture before connecting with any other vent pipe; in general, this will be approximately 3'-6" above the finished floor. Branches shall be arranged to pitch back to fixtures.
- K. The individual vent pipes shall be collected together in branch vent lines and connected to existing vent connections through roof.
- L. Any existing vents through roof, damaged, or if flashing on roof comes loose while connecting new vent to them shall be repaired and reflashed to the roof as required to maintain waterproofing the satisfaction of the Architect.

END OF SECTION

SECTION 22 0300

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. The work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely do all plumbing fixture work, as required by the Drawings and as specified herein, including but not limited to the following: plumbing fixtures, traps, fittings, trimmings, brackets, plates, anchor, chair carriers and supports.
- B. Just before the Owner's taking over the work in the building, this Contractor shall thoroughly clean all fixtures furnished and set under this Contract, leaving every fixture in perfect condition and ready for use.
- C. Submit shop drawings and roughing sheets for all equipment for checking and approval.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES AND EQUIPMENT

- A. All fixtures shall be free from imperfections, true as to line angles, curves and color, smooth, watertight, complete in every respect and practically noiseless in operation, Fixtures specified are given as the typical standard required as manufactured by American Standard and they or other similar approved fixtures as made by Kohler or Eljer Companies shall be furnished, set and connected in good substantial, neat workmanlike manner.
- B. The letter designations hereinafter correspond with the schedule on the Drawings.
 - 1. Water Closet - Type A1
Flush valve type, wall mounted 2856.128 "Afwall" vitreous china, siphon jet action, elongated bowl, 1-1/2" top spud, Zurn recessed hard wired 1.6 GPF low consumption flush valve, Model ZEMS 6142AV Olsonite #95 open front seat cover. Provide floor mounted carrier equal to Zurn Z1203 series or Z1204 series. Mount sensor assembly behind Zurn Model ZEMS6199 – BX17-C access panel with Vandal resistant screws. Furnish panel for general contractor installation.
 - 2. Water Closet - Type A2 (Handicapped) Same as above except Handicapped.
 - 3. Lavatory - Type B (Handicapped)
0355.012 "Lucerne" white vitreous china lavatory with 4" centers, concealed arm support, 7723.018 offset grid drain, adjustable trap, loose key stops and all required trim. Zurn Model Z6915–XL–CWB hard wired faucet with mini junction box. Mount lavatory 34" above finished floor. Lavatory piping guards by general contractor.
 - 4. Urinal - Type C
6590.501 "Washbrook" white vitreous china, siphon jet urinal, wall hanger, 3/4" top spud, Zurn recessed hard wired Model ZEMS6197AV flush valve with vacuum breaker and angle stop, Josam series 17800 or Zurn Z-1222 concealed chair carrier. Mount sensor assembly behind Zurn Model ZEMS6199-BX17-U access panel with Vandal resistant screws. Furnish panel for general contractor installation.

5. Floor Drains:
Josam series 30000A or Zurn Z415 type "B" coated cast iron, two piece body with double drainage flange, flashing collar, weepholes, bottom outlet and adjustable strainer.
6. Floor Drain Trap Seal:
Zurn model Z1072 "Z-Shield" barrier trap seal device ASSE 1072.
7. Wall Hydrants (Interior): J.R. Smith 5609 QT bronze nickel plated quarter turn with ¾" hose connection, integral vacuum breaker with vandal resistant cap and T-handle key. Install under lavatories in all toilet rooms.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All fixtures shown on Drawings shall be set, connected and tested by the Contractor. He shall also make all water; soil, waste, vent and other service connections to fixtures as shown on Drawings or as directed and shall set, furnish, connect and test all necessary fittings.
- B. All pipes at fixtures passing into walls, floors or partitions shall be provided with heavy cast brass escutcheons and security (tamperproof) set screws finished to match the pipe. No "waiving" of this section will be permitted.
- C. All fittings escutcheons, faucets, traps, exposed piping etc. shall be brass, chrome plated over nickel plate with polished finish. Any visible hanger nuts shall be security (tamperproof) type and shall likewise be chrome plated over nickel plate.
- D. This Contractor shall be responsible for protecting all plumbing fixtures including in these Specifications against injury from the building materials, tools and equipment. Any fixtures damaged during the construction period shall be replaced new. After all fixtures are set, this Contractor shall carefully grout all around fixtures.

END OF SECTION

SECTION 22 0420

SUPPORTS, SLEEVES AND PLATES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. This Contractor shall furnish and install all plates, hangers and supports for his piping.
- B. All piping shall be hung or supported from structural members only.

PART 2 - PRODUCTS

2.1 PIPING

- A. All piping shall be supported from building structure in a neat and workmanlike manner wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze hangers. Vertical risers shall be supported at each floor line with steel pipe clamps. Use of wire perforated metal to support pipes will not be permitted. Hanging pipes from other pipes will not be permitted.
- B. Necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations shall be furnished and installed. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing.
- C. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction, when the supported piping is hot.
- D. Pipe hangers shall be as manufactured by Grinnell, whose catalog numbers are given herein, or equivalent Carpenter and Paterson, or F&S Mfg. Co.
- E. Piping shall be supported as follows unless otherwise indicated on the Drawings:
 - 1. Piping: 1-1/2 inch and smaller Fig. #260 adjustable clevis hanger. 2 inch and larger Fig. #174 one-rod swivel roll hanger.
 - 2. Two-rod hangers shall be used for piping close to the ceiling slab or where conditions prohibit use of other hanger types.
 - 3. Anchors for hanger rods shall be Phillips "Red Head" self-drilling type. Anchors shall be placed only in vertical surfaces.
 - 4. Spacing of pipe supports shall not exceed 6 feet for pipes up to 1-1/2 inch and 10 feet on all other piping.
 - 5. Hangers shall pass around insulation and a 16 gauge steel protective band; 12 inch long shall be inserted between hangers and insulation.

6. All piping shall be supported to allow free movement where expanding or contracting. Pipe shall be anchored as required or directed.
 7. All lateral runs of piping shall be securely supported on hangers, rolls, brackets, etc. and in a manner to allow for proper expansion and elimination of vibration.
 8. 2 inch and smaller pipe, where run on walls, shall be supported on wrought iron "J" hook brackets with anchor bolts.
 9. All horizontal pipe, where run overhead or on walls, shall be supported as follows unless otherwise indicated: On adjustable steel clevis type hangers suspended on hanger rods, pipe sizes up to and including 4 inch.
- F. Space limitations in hung ceilings spaces and conditions in other locations may require use of other type of hangers than those specified above. Suitable and approved pipe hangers shall be provided for such job conditions.
- G. All supports shall be fastened to structural members or additional steel supports furnished by this Contractor.
- H. Hanger rods shall be steel, threaded with nuts and lock nuts, sizes in accordance with following schedule:

<u>Pipe Size</u>	<u>Rod Size</u>
3/4" to 2" inclusive	3/8"
2-1/2" and 3" inclusive	1/2"
4" and 5" inclusive	5/8"
6"	3/4"
8" to 12" inclusive	7/8"

- I. Cast iron piping shall be supported at intervals of not more than (5) feet (at each hub) on straight runs.

PART 3 - EXECUTION

3.1 PIPING

- A. Where pipes pass through masonry, concrete walls, foundations, or floors, this Contractor shall set sleeves as are necessary for passage of pipes. These sleeves shall be of sufficient size to permit insulation where required to be provided around pipe passing through. This Contractor shall be responsible for exact location of these sleeves.
- B. Sleeves shall not be used in any portion of building where use of same would impair strength or construction features of the building. Inserts for supporting lateral pipes and equipment shall be placed and secured to form work, and all sleeves inserts locations shall be thoroughly checked with Architect so as not to conflict with other trades.
- C. Where pipes pass through floor or walls, they shall be provided with chromium plated escutcheons.
- D. Anchor horizontal piping where indicated and wherever necessary to localize expansion or prevent undue strain on branches. Anchors shall be heavy forged construction entirely separate from supports.

- E. Anchor vertical piping wherever indicated and wherever necessary to prevent undue strains on offsets and branches. Anchors, unless otherwise noted shall be heavy steel clamps securely bolted and welded to pipes. Extension ends shall bear on building construction.
- F. Auxiliary steel supports that may be required for all mechanical equipment shall be furnished and installed by this Contractor.
- G. All operating equipment including pumps, piping, etc. shall be supported so as to produce minimum amount of noise transmission.

END OF SECTION

SECTION 22 0430

INSULATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. The work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely do all insulation work as required by the Drawings and as specified herein including but not limited to the following: Insulation, covering, bands, tie wire.

PART 2 - PRODUCTS

2.1 INSULATION

- A. The materials as specified have been selected from the catalogs of Owens-Corning Fiberglass Corp. and Johns-Manville Sales Corporation and are representative of the quality, design and finish desired. Insulation as manufactured by Gustin Bacon Co., or other approved manufacturer may be submitted for approval provided the product meets fully in all respects (such as density, moisture absorption, alkalinity, thermal-conductivity, jackets) to the materials as delineated below.
- B. All insulation shall be UL rated non-combustible type classified flame spread-25, smoke-developed-50.

2.2 PIPING, FITTINGS AND VALVES

- A. All insulation thickness shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code.
- B. Minimum pipe insulation shall be:
 - 1. Hot water piping up to 1-1/4" - 1" insulation and piping 1-1/2" and larger - 1-1/2" insulation.
 - 2. Cold water piping up to 1-1/2" - 1/2" insulation and piping 1-1/2" and larger - 1" insulation.
- C. Domestic cold, hot water hot water return indirect waste, storm and piping aboveground. All piping shall be insulated with sectional glass fiber insulation, Owens-Corning 2 piece ASJ/SSL. Joints between sections shall be sealed with factory supplied 3 inch wide sealing strips. Sealing by means of Owens Corning self-sealing lap will also be acceptable. Install (anti-sweat) vapor barriers on all cold water piping.
- D. Domestic hot and cold water valves and fittings - Fittings, valves, etc. shall be insulated with flexible blanket insulation compressed to 1/2 its thickness, tied on with jute twine over which shall be applied a flood coat of Insul-Coustic IC-102 and 10-20 open weave glass cloth. Glass cloth to be finished within additional coat of IC-102. Insulation blanket shall be Owens-Corning wrap.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All insulation on pipes running through walls, floors, partitions and beams shall be continuous through sleeves and openings.
- B. Insulation shall be installed only after all tests of the piping system have been completed.
- C. All insulation shall fit snugly.
- D. All surfaces shall be clean and dry when insulation is applied.
- E. Longitudinal joints shall be on least conspicuous side off the pipe.
- F. Valves shall be insulated up to the packing unit.
- G. As specified hereinbefore, all horizontal runs of piping will be supported on adjustable clevis or group trapeze type hangers. Pipe hangers will be installed outside of the insulation. Where hangers occur, prefabricated insulation protective saddles shall be "Insul-Shield-Multi-Purpose-Saddle" as manufactured by Insul-Cooustic Corp. or approved equal.
- H. Hot and cold water branch piping extending through slab or knockout panels to serve equipment shall be insulated to a point 4 inch above the top of sleeve provided for pipe.
- I. The use of staples shall not be permitted.
- J. It is the intent of this Specification that all vapor barriers be continuous throughout. Reinstate existing piping at point of new pipe connections.

END OF SECTION

SECTION 22 0470

TESTS AND ADJUSTMENTS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 TESTS AND ADJUSTMENTS

- A. The Contractor shall, at his own expense, during the progress of the work or upon its completion as ordered make such tests as are specified or as required by and in the presence of the Architects, Building Inspectors, etc. At least 48 hours' notice shall be given in advance of all tests.
- B. The Contractors shall provide all apparatus, temporary work or other requirements necessary for all tests. He shall take all due precautions to prevent damage to the building, its contents or the work of the other Contractors, that may be incurred by all tests. This Contractors shall also be responsible for the work of other Contractors that may be damaged or disturbed by the tests or the repair or replacement of his work, and he shall without extra charges, restore to its original condition, any work of other Contractors to do the work of restoration.
- C. Tests on the various systems may be conducted in sections as the work progresses or when the systems are completed.
- D. No caulking of pipe joints to remedy leaks will be permitted except where joints are made with lead and oakum.
- E. Each section of the sanitary, storm and vent piping tested shall have all openings tightly closed with screw plugs, or equal device. The drainage and vent systems shall be filled with water and proven tight under a 10'-0" head for a minimum of four (4) hours. Water level must remain constant through test without adding water.
- F. Upon final completion of the sanitary systems and when all fixtures and appurtenances have been set and the systems are in complete working order, all traps in the systems shall be filled with water and a thick penetrating smoke shall be introduced into the entire system.
- G. As smoke appears at the stack openings on the roof, such openings on the roof shall be tightly closed and a pressure equivalent to 1-1/2 inch of water shall be maintained during the test. Oils of peppermint shall be added at the smoke making machines so that any leakage is readily discernible.
- H. Before any covering is applied to the domestic water piping systems, the entire domestic water piping systems shall be hydrostatically tested for eight (8) hours to a hydraulic pressure of 125 psig.
- I. At the completion of the test, Contractor shall furnish the Owner with one (1) copy of test certificates as issued by the insurance company.
- J. Adjustments: Tests and adjustments shall be repeated as often as necessary until the systems are tight and are to the entire satisfaction of the Plumbing Inspector, Engineers and any other authorities having jurisdiction.
 - 1. Contractor is to thoroughly instruct the building custodian in the proper care and operation of the entire system. Contractor shall prepare for use by custodian, detailed brochures of instructions in non-technical terms, describing the maintenance and operation of all fixtures, apparatus, valves, controls etc. furnished by him.

2. Should any part of the work performed under this Contract fail to function because of cracked piping, obstructions, debris in piping, leaks in piping or any other cause, this Contractor shall disconnect, clean and reconstruct the work at his own expense and pay for any damages to adjoining work.
3. Water flow is to be balanced and adjusted to all flush valves, faucets, etc.
4. All parts of the plumbing system are to be thoroughly flushed until cleared of all grease and sediment and all dirt pockets cleaned. Repeat as often as necessary, open all cleanouts and reset in graphite.
5. All new motors shall be oiled as required.
6. All new valves are to have stuffing boxes packed and adjusted.

END OF SECTION

SECTION 22 0480

TAGS, CHARTS AND IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 TAGS, CHARTS AND IDENTIFICATION

- A. Every valve installed under this Contract shall be tagged or labeled as follows: Tag shall be etched brass securely fastened to valve handwheels with heavy brass "S" hooks, soldered closed. At lock shield and similar type valves, tags for same shall be securely wired to valve body.
- B. Charts shall be provided for each piping system, as approved and shall consist of schematic diagrams of piping layouts showing and identifying each valve and piece of equipment etc., and its use. Upon completion one (1) copy of diagrams and valve charts suitably framed under glass, shall be furnished and mounted where directed. One (1) copy of diagrams and valve charts shall be delivered to Owner.
- C. This Contractor shall provide on all piping, semi-rigid, wrap around plastic identification markers equal to Seton Snap-Around and/or Seton Strap-On pipe markers.
- D. Each marker background is to be appropriately color coded with a clearly printed legend to identify the contents of the pipe. Directions of flow arrows are to be included on each marker.
- E. Identification of all piping shall be adjacent to each valve, at each pipe passage through wall, floor and ceiling construction and at each branch and riser take-off.
- F. Identification shall be on all horizontal pipe runs, marked every 15 ft. as well as at each inlet outlet of equipment at changes in direction.

END OF SECTION

SECTION 22 0490

GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 GUARANTEE

- A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace and/or repair and any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION

SECTION 23 0100

GENERAL CONDITIONS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GENERAL CONDITIONS

- A. Before submitting a proposal, Bidders shall examine all related to this work and shall become fully informed as to the extent and character of the work required and its relation to the other work in the building.
- B. Before commencing work, the Contractor will examine all conditions of the project upon which his work is in any way dependent for perfect workmanship according to the intent of this Specification. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed by this Contractor and acceded to by the Owner's representative in writing before the Contractor begins any part of the work.
- C. The Contractor will pay for all licenses, permits and inspection fees required by civil authorities having jurisdiction. Comply with all laws, ordinances, regulations, and fire underwriter's requirements applicable to work herein specified without additional expense to the Owner.
- D. Small scale drilling through walls and floors or cutting of piping insulation which may contain asbestos shall be performed by a person with a "restricted asbestos handler allied trades certificate" and shall have a copy of it in his possession at all times while working of the project. This shall also apply to removal of piping, ductwork, or equipment insulation.
- E. It is specifically intended that anything (whether material or labor), which is usually furnished as a part of such equipment, as is hereinafter called for (and which is necessary for the completion and proper operation) shall be furnished as part of this Contract without additional cost the Owner, whether or not shown in detail or described in the Specifications.
- F. When Drawings and Specifications conflict or there is a question as to the proper intent of this Contract, the Contractor shall assume the greater quantity, the higher quality and/or the more expensive method in his pricing. All questions shall be directed to the Architect/Engineer in writing only and only up to ten (10) days prior to bidding.
- G. The Drawings indicate the general runs of the piping, ductwork, etc. systems and the location of equipment and apparatus, however it shall be understood that the right is reserved by the Architect/Engineer to change the location of piping work, ductwork, equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.
- H. All components supplied by this Contractor shall be UL listed and/or ETL labeled and shall conform to ASHRAE Standard 15.
- I. Any changes from the Drawings and Specifications and any interpretation thereof shall have the prior approval of the Architect/Engineer. The Contractor shall submit in writing, at the time of signing the Contract, any items of necessary labor and materials, which, in his opinion, are lacking in requirements of the Drawings and Specifications to insure a complete job in all respects. No consideration will be granted to alleged misunderstanding of materials to be furnished, work to be done, or conditions to be complied with, it being understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying Drawings.

END OF SECTION

SECTION 23 0110

SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SCOPE OF WORK

- A. The work under this section includes all labor, materials, equipment, tools, transportation, and the performance of all work necessary and required for the furnishing and installation complete of all work as shown on the Contract Documents, including but not necessarily limited to the following:
1. Ductless Split System units and related appurtenances.
 2. Exhaust fans and related appurtenances.
 3. Existing Exhaust Fan rehabilitation and related appurtenances.
 4. All required piping, valves, and related specialties.
 5. Sheetmetal ductwork and related accessories.
 6. Duct and pipe insulation.
 7. Registers, diffusers, and dampers.
 8. Rigging of equipment.
 9. Furnish all combination motor starter/disconnects for equipment (with the exception of starters and electric items already mounted on equipment or equipment not requiring same). Fan motor starter/disconnects shall have contacts for ATC connection and a terminal block connection for Fire Alarm fan shutdown. Starters per manufacturers recommendations. Underwriters inspection and certificate required. Coordinate with Electrical Contractor.
 10. Air Balancing.
 11. Automatic temperature controls with complete wiring (regardless of voltage).
 12. Testing, adjusting and start-up of equipment.
 13. Painting and identification of all equipment and piping.
 14. Firestopping per NFPA requirements (UL approved systems).
 15. Operating and maintenance instructions.
 16. As-Built Drawings - Refer to Division 1.
 17. Cutting and Patching - Refer to Division 1.

- B. Coordination Drawings: Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of all claims for either or both "time" and "money".

1.2 REMOVALS

- A. Removals should be coordinated with other trades affected.
- B. Piping which penetrates the construction may be cut and capped provided capping is done beneath the finished surfaces so that construction over it can be achieved.
- C. Soot Removal: In connection with the dismantling of boilers, Contractor shall gather with a vacuum-cleaning machine all accumulations of soot and shall remove all soot from the base of the chimney.
- D. All removals shall be removed from the site.

1.3 ALTERATION WORK

- A. All equipment, piping, control components, etc. to be removed, shall be disposed of or salvaged as directed by the Owner. They shall not be removed from the premises without the Owner's approval.
- B. All piping to be removed shall be properly plugged or capped so that upon completion of all new work, all abandoned piping shall be concealed in finished areas.
- C. No dead ends shall be left on any piping upon completion of job. The existing system shall be left in perfect working order upon completion of new work.
- D. Location and sizes of existing piping, ductwork, equipment, etc. are approximate. Exact sizes and locations of all existing work shall be verified on the job.

END OF SECTION

SECTION 23 0260

DUCTLESS SPLIT SYSTEMS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 SYSTEM DESCRIPTION

- A. Outdoor-mounted, air-cooled split system outdoor section suitable for rooftop installation. Unit shall consist of a hermetic reciprocating, scroll, or rotary compressor, an air-cooled coil, propeller-type blow-thru outdoor fans, reversing valve, accumulator, holding refrigerant charge heating mode metering device, and control box. Unit shall discharge air horizontally as shown on the contract drawings. Units shall function as the outdoor component of an air-to-air cooling and heating system.
- B. Indoor, in-the-ceiling-mounted or wall mounted direct-expansion fan coil to be matched with the commercial heat pump unit.

1.2 QUALITY ASSURANCE

- A. Unit construction shall comply with ANSI/ASHRAE 15, latest revision, and with the NEC.
- B. Unit shall be rated (when matched with appropriate outdoor unit) per ARI Standard 210/240. Units shall be certified by UL and CSA.
- C. Units shall be constructed in accordance with UL standards.
- D. Units shall be listed in the CEC directory.
- E. Unit cabinet shall be capable of withstanding Federal Test Standard No. 141 (method 6061) 500-hour salt spray test.
- F. Air-cooled condenser coils shall be leak tested at 350 psig air pressure with the coil submerged in water.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 OUTDOOR HEAT PUMP CONDENSING UNIT

- A. Factory assembled, single piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, charge of R-410A refrigerant and special features required prior to field start-up.
- B. Unit Cabinet
 - 1. Unit cabinet shall be constructed of galvanized-steel, bonderized and coated with a baked-enamel finish.
 - 2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressor, fan, and control components.

3. Outdoor compartment shall be isolated and have an acoustic lining to assure quiet operation.
- C. Fans
1. Outdoor fans shall be direct-drive propeller type and shall discharge air horizontally. Fans shall blow air through the outdoor coil.
 2. Outdoor fan motors shall be totally enclosed, single-phase motors with class B insulation and permanently lubricated sleeve bearings. Motor shall be protected by internal thermal overload protection.
 3. Shaft shall have inherent corrosion resistance.
 4. Fan blades shall be corrosion resistant and shall be statically and dynamically balanced.
 5. Outdoor fan openings shall be equipped with PVC coated protection grille over fan and coil.
- D. Compressor
1. Compressor shall be fully hermetic reciprocating or scroll type.
 2. Compressor shall be equipped with oil system, operating oil charge, and motor. Internal overloads shall protect the compressor from over temperature and over current. Scroll compressors shall also have high discharge gas temperature protection if required.
 3. Motor shall be NEMA rated class F, suitable for operation in a refrigerant atmosphere.
 4. Reciprocating compressors shall be equipped with crankcase heaters to minimize liquid refrigerant accumulation in compressor during shutdown and to prevent refrigerant dilution of oil.
 5. Compressor assembly shall be installed on rubber vibration isolators and shall have internal spring isolation.
 6. Compressors shall be single phase or 3-phase as specified on the Contract Drawings.
- E. Outdoor Coil: Coil shall be constructed of aluminum fins mechanically bonded to internally enhanced, seamless copper tubes that are cleaned, dehydrated, and sealed.
- F. Refrigeration Components: Refrigerant circuit components shall include brass external liquid line service valve with service gage port connections, suction line service valve with service gage connection port, service gage port connections on compressor suction and discharge lines with Schrader-type fittings with brass caps, accumulator, bi-flow filter drier, pressure relief, reversing valve, and heating mode metering device.
- G. Controls and Safeties: Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:
1. Controls
 - a. Time delay restart to prevent compressor reverse rotation on single-phase scroll compressors.
 - b. Automatic restart on power failure.
 - c. Safety lockout if any outdoor unit safety is open.
 - d. A time delay control sequence is also provided standard through the fan coil board, thermostat, or controller.
 - e. High-pressure and liquid line low-pressure switches.

- f. Automatic outdoor-fan motor protection.
 - g. Start capacitor and relay (single-phase units without scroll compressors).
- 2. Safeties
 - a. System diagnostics.
 - b. Compressor motor current and temperature overload protection.
 - c. High pressure relief.
 - d. Outdoor fan failure protection.
- H. Electrical Requirements
 - 1. Unit shall operate on a 208-v or 230-v, 60 Hz power supply as specified on the equipment schedule.
 - 2. Unit shall operate on single-phase, 60 Hz power at 115 v or 208/230 v, or three-phase, 60 Hz power at 208/230 v or 460 v, as specified.
 - 3. Unit electrical power shall be a single point connection.
 - 4. Unit control voltage to the indoor-fan coil shall be 24 v, except 38BK009 and 012 units, which shall supply line voltage.
 - 5. All power and control wiring must be installed per NEC and all building codes.
 - 6. Unit shall have high- and low-voltage terminal block connections.
- I. Special Features (Field Installed)
 - 1. Low-Ambient Kit: Control shall regulate fan-motor cycles in response to saturated condensing pressure of the unit. The control shall be capable of maintaining a condensing temperature of 100 F \pm 10 F with outdoor temperatures to -20 F. Installation of kit shall not require changing the outdoor-fan motor.
 - 2. Liquid Solenoid Valve: This electronically operated shutoff valve shall close and open in response to compressor operation. The valve should be used with all long-lines applications (over 100 ft).
 - 3. Crankcase Heater (units with scroll compressors only): Unit shall be shipped with a clamp-on compressor oil sump heater.

2.2 WALL MOUNT INDOOR UNIT

- A. Indoor, direct-expansion, wall mount fan coil. Unit shall come complete with cooling/heating coil, electric heater, fan, fan motor, piping connectors, electrical controls, condensate pump, and hanging brackets.
- B. Unit cabinet shall be constructed of zinc-coated steel. Fully insulated discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall have filter tracks and cleanable filters which shall be accessible from below with a 1/4 -turn fastener. Adjacent room cooling to be provided by a simple knock-out in the cabinet side panel, and cabinet shall have provisions to accommodate a limited amount of ductwork, if desired.
- C. Fan shall be a centrifugal, direct-drive blower type with air intake in center of the unit and discharge on the perimeter. Air louvers shall be adjustable for 2, 3, or 4-way discharge.
- D. Coil: Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins will be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a factory-installed condensate pump and drain connection for hose attachment to remove condensate.

- E. Motors: Motor shall be totally enclosed and permanently lubricated with inherent protection. Fan motor shall be 3-speed.
- F. Controls: Controls shall be 24-v and shall be easily operated by the user from a wall-mounted control unit. Float control shall be in the condensate sump to shut unit down in case of pump malfunction. A wall-mounted electromechanical thermostat with 3 fan-speed selections and an auto/manual switch shall be supplied for field installation. Automatic changeover from cooling to heating modes and selectable 2 or 4 minute start-up delay shall be included. The R-22 refrigerant shall be controlled with a piston-type refrigerant metering device, and evaporator coil freeze protection shall be provided.
- G. Filters: Unit shall have filter track with factory-supplied cleanable filters.
- H. Electrical Requirements: Unit shall operate on a 208-v or 230-v, 60 Hz power supply as specified on the equipment schedule.
- I. Operating Characteristics: (See Drawing Schedule)
- J. Special Features (Field Installed)
 - 1. Electronic Programmable Thermostat:
Thermostat shall be commercial grade and shall provide 7-day, 4-event scheduling. Integral sub base shall be included. Thermostat shall also provide 3-speed fan switchover capability, air sweep auto changeover, and shall not require a battery to retain memory.
 - 2. Fresh Air Intake Kit:
Kit shall include filter and duct connections to provide for outdoor ventilation air.

**2.3 AIR CONDITIONING CONDENSATE PUMP
(PROVIDE IN ALL CASES WHERE CONDENSATE CANNOT DRAIN BY GRAVITY)**

- A. Pump shall be equal to "Little Giant" model no. VCMA-15ULS-554401. Automatic, 15 ft. shut-off, 1/2 gallon tank, safety switch check valve, 6 ft. power cord power cord with plug.
- B. Provide 3/8" copper tubing discharge piping installed per manufacturer's recommendations.
- C. For roof discharge applications provide pitch pocket, rigid 3/8" copper discharge piping and gooseneck turned down 12 inches above roof. Provide splash block and remove pump check valve before installation.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.
- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION

SHEETMETAL WORK AND RELATED ACCESSORIES

SECTION 23 0300

FANS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 FANS

- A. Furnish and install fans of the type, models, size and capacity indicated on the Drawings. Models indicated are as manufactured by Carnes Company. ACME or Greenheck, with equivalent characteristics will be considered.
- B. Refer to Drawing schedule for required accessories and related appurtenances.

2.2 ROOF EXHAUST FANS

- A. All roof exhaust fans shall be centrifugal roof exhausters of aluminum rustproof construction.
- B. Units shall be direct connected with full ball-bearing motor. Power unit shall be isolated against vibration by means of oil resistant rubber or spring steel mounting.
- C. Provide square insulated curb cap of aluminum with aluminum liner as an integral part of the unit. Each unit shall be equipped with a back draft or automatic damper, disconnect switch for the motor and birdscreens.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.
- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed, and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt, and other foreign substances.

END OF SECTION

SECTION 23 0400

SHEETMETAL WORK AND RELATED ACCESSORIES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements shall govern work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 SHEETMETAL DUCTWORK

- A. Contractor shall furnish and install all sheetmetal ducts as shown on the Drawings. While the Drawings shall be adhered to as closely as possible, the Engineer reserves the right to vary the run and size to meet the field conditions. Any duct size not shown shall be sized in proportion to the air carried at the same resistance in similar ductwork, or of size as directed.
- B. All ductwork shall be constructed of galvanized steel gauges in accordance with the latest edition of the ASHRAE/SMACNA Guide. Bracing angles for ductwork shall be hot dipped galvanized for steel ductwork and appropriate gauge for aluminum ductwork. All ducts 18" and over in width shall be cross broken to prevent flutter.
- C. Round ductwork shall be galvanized steel, spiral lock seam construction of gauges in accordance with the latest edition of ASHRAE/SMACNA guide. Fittings shall be constructed in standing seam manner. All seams, joints and collars shall be sealed in accordance with SMACNA guidelines for medium pressure ductwork to minimize noise and streaking. Ductwork and fittings shall be connected with sheetmetal couplings and sealed as to allow no leakage.
- D. Ducts shall be braced as follows:
 - 1. All ducts not exceeding 24" on one side shall be assembled with airtight slip joints.
 - 2. 25" to 40" larger dimension 1" x 1" x 1/8" angles.
 - 3. 41" to 60" larger dimension 1-1/2" x 1-1/2" x 1/8" angles.
 - 4. All bracing angles shall be a minimum of 4' apart along the length of the duct.
 - 5. Furnish and install all angles and frames for all registers, diffusers, grilles, and louvers.
 - 6. Support horizontal ducts with hangers spaced not more than 8' apart. Place hangers at all changes in direction. Use strap hangers for cuts up to 30" wide.
- E. Comply with all State and Local regulations regarding fire stopping and fireproofing. Provide fusible link fire dampers as required by State, local and Underwriter authorities and where indicated on the Drawings. Each fire damper shall be installed in such a manner as to permit ready access for inspection and maintenance purposes.
- F. Provide splitter and butterfly dampers, deflecting vanes for control of air volume and direction and for balancing systems, where indicated, specified, directed and as required for the proper operation of the systems. Dampers shall be of the same material as the duct, at least one gauge heavier than the duct, reinforced where indicating quadrant and locking device for adjusting damper and locking in position.

- G. Where ducts fewer than 100 square inches penetrate a rated wall, steel ductwork system of a minimum 0.0127-inch thickness shall be used.
- H. All elbows shall have a minimum center line radius of 150% of duct width. If the radius is smaller, turning vanes shall be used: Turning vanes shall be double thickness, fitted into slide strips and screwed or riveted to duct below.
- I. Contractor shall furnish and install all access doors in ducts as required. Access doors shall be of the pan type 1" thick and shall be provided with two galvanized hinges and suitable latched. Access doors insulated with same thickness material as duct and shall be double casing construction.

2.2 REGISTERS AND DIFFUSERS

- A. Registers and diffusers shall be installed where shown on the Drawings and shall be of the sizes specified and the type indicated on the drawing schedule.
- B. All registers and diffusers shall be installed in accordance with manufacturer's recommendations.
- C. Registers and diffusers shall be as manufactured by Carnes, Hart and Cooley or Anemostat Co.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories, and components.
- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed, and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION

SECTION 23 0420

SUPPORTS, SLEEVES AND PLATES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. This Contractor shall furnish and install all plates, hangers and supports for his equipment including piping, headers, fans expansion tank, ductwork, etc.
- B. All ductwork, piping and equipment shall be hung or supported from structural members only.

PART 2 - PRODUCTS

2.1 PIPING, DUCTWORK AND EQUIPMENT

- A. All piping shall be supported from building structure in a neat and workmanlike manner wherever possible, parallel runs of horizontal piping shall be grouped together on trapeze hangers. Vertical risers shall be supported at each floor line with steel pipe clamps. Use of wire perforated metal to support pipes will not be permitted. Hanging pipes from other pipes will not be permitted.
- B. Necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations shall be furnished and installed. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing.
- C. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction, when the supported piping is hot.
- D. Pipe hangers shall be as manufactured by Grinnell, whose catalog numbers are given herein, or equivalent Carpenter and Paterson, or F&S Mfg. Co.
- E. Piping shall be supported as follows unless otherwise indicated on the Drawings:
 - 1. Heating piping shall be 1-1/2 " and smaller Fig. #260 adjustable clevis hanger. 2" and larger Fig. #174 one-rod swivel roll hanger.
 - 2. Two-rod hangers shall be used for piping close to the ceiling slab or where conditions prohibit use of other hanger types.
 - 3. Anchors for hanger rods shall be Phillips "Red Head" self-drilling type. Anchors shall be placed only in vertical surfaces.
 - 4. Spacing of pipe supports shall not exceed 8 feet for pipes up to 1-1/2" and 10 feet on all other piping.
 - 5. Hangers shall pass around insulation and a 16-gauge steel protective cradle; 12" long shall be inserted between hangers and insulation. Insulation under cradle shall be high density calcium silicate or approved equal to prevent crushing.

6. All piping shall be supported to allow free movement where expanding or contracting. Pipe shall be anchored as required or directed.
 7. All lateral runs of piping shall be securely supported on hangers, rolls, brackets, etc. and in manner to allow for proper expansion and elimination of vibration.
 8. 2" and smaller pipe, where run on walls, shall be supported on wrought iron "J" hook brackets with anchor bolts.
 9. All horizontal pipe, where run overhead or on walls, shall be supported as follows unless otherwise indicated: On adjustable steel clevis type hangers suspended on hanger rods, pipe sizes up to and including 4".
- F. Space limitations in hung ceilings spaces and conditions in other locations may require use of other type of hangers than those specified above. Suitable and approved pipe hangers shall be provided for such job conditions.
- G. All supports shall be fastened to structural members or additional steel supports furnished by this Contractor.
- H. Hanger rods shall be steel, threaded with nuts and lock nuts sizes in accordance with the following schedule:
- | <u>Pipe Size</u> | <u>Rod Size</u> |
|-------------------------|-----------------|
| 3/4" to 2" inclusive | 3/8" |
| 2-1/2" and 3' inclusive | 1/2" |
| 4" and 5" inclusive | 5/8" |
| 6" | 3/4" |
| 8" to 12" inclusive | 7/8" |
- I. Hangers for copper tubing shall be tacked up with formed lead sheet on which tubing, or pipe shall be placed.
- J. Where pipes pass through masonry, concrete walls, foundations, or floors, this Contractor shall set sleeves as are necessary for passage of pipes. These sleeves shall be of sufficient size to permit insulation where required to be provided around pipe passing through. This Contractor shall be responsible for exact location of these sleeves.
- K. Sleeves shall not be used in any portion of building where use of same would impair strength of construction features of the building. Inserts for supporting lateral pipes and equipment shall be placed and secured to form work, and all sleeves inserts locations shall be thoroughly checked with Architect so as not to conflict with other trades.
- L. Where pipes pass through floor or walls, they shall be provided with chromium plated escutcheons.
- M. Anchor horizontal piping where indicated and wherever necessary to localize expansion or prevent undue strain on branches. Anchors: Heavy forged construction entirely separate from supports.
- N. Anchor vertical piping wherever indicated and wherever necessary to prevent undue strain on offsets and branches. Anchors, unless otherwise noted: Heavy steel clamps securely bolted and welded to pipes. Extension ends shall bear on building construction.

- O. Ducts shall be hung with 1" x 1/8" metal straps. When width of duct is less than 48", hangers shall be fastened to side of ducts. Auxiliary steel supports that may be required for all mechanical equipment shall be furnished and installed by this Contractor. All operating equipment including fans, piping, etc. shall be supported so as to produce minimum amount of noise transmission.
- P. Refer to "General Requirements for Mechanical and Electrical Trades" as well.

2.3 POWDER-ACTUATED FASTENERS IN PRECAST CONCRETE

- A. Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type required and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing in accordance to ASTM E 1190 conducted by a qualified independent agency. Anchors shall not be installed where reinforcing strands are located in plank. Review precast plank shop drawings to determine location.
- B. Refer to precast concrete plank shop drawings for location of strand reinforcing and cores. Do not anchor where reinforcing is located. Use powder-actuated fasteners in concrete, toggle bolts or thru core anchors with plates supported on top of plank in cores.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.
- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION

SECTION 23 0430

INSULATION AND COVERINGS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. Furnish insulation for all piping, equipment and sheetmetal work as noted.
- B. Insulate no piping, ducts or equipment until tested and approved for tightness. All piping and ducts shall be dry when covered. Where existing insulation has been damaged, altered or removed during the course of the work, it shall be replaced with new insulation in a neat manner to match the adjacent insulation.
- C. All insulation must be done by an approved Sub-Contractor or by mechanics skilled in this line of work.
- D. Fire hazard classification shall be 2550 per ASTM E-84, NFPA 255 and UL 723. Insulation shall be rated non-combustible type classified flame spread - 25, smoke developed - 50.

PART 2 - PRODUCTS

2.1 DUCTWORK (INDOOR)

- A. All supply, outside air intake and exhaust (on discharge side of fan) and return (in unconditioned spaces) ductwork shall be covered with fiberglass with aluminum foil vapor barrier. All joints shall be lapped so maximum coverage is achieved.
- B. All insulated ductwork shall be insulated with fiberglass board insulation with canvas finish in areas where ductwork is exposed.
- C. Insulation thickness shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code.
- D. Thermal acoustic lining of ductwork shall be 1-1/2" thick elastomeric foam duct lining Armacel Model AP Coil-Flex. The lining shall provide energy efficiency, indoor air quality and acoustic reducing properties and shall meet the Life Safety Standards as established by NFPA 90A and 9B and conform to the requirements of ASTM C 1071.

2.2 DUCTWORK (OUTDOOR)

- A. All exposed ductwork shall be insulated with 2" thick closed cell, flexible elastomeric foam thermal and acoustic insulation (Armacel Model AP Armatuff SA or approved equal with weatherproof liner).
- B. Cover insulation watertight with a weather-proofing cladding composite membrane consisting of a multiply embossed UV-resistant aluminum foil/polymer laminate to which is applied a layer of rubberized asphalt specially formulated for use on insulated duct and piping applications. The rubberized asphalt acts as the substrate adhesive and provides the self-healing characteristics necessary to seal around punctures. Protecting the rubberized asphalt is an easily removed plastic release liner which gives its peel and stick functionality.
- C. Insulation and covering shall be installed per manufactures recommendations and requirements. Make proper provision with ductwork support(s) so that insulation is not crushed.
- D. Make proper provision with ductwork support(s) so that insulation is not crushed.

2.3 PIPING / EQUIPMENT (INDOOR)

- A. All new or altered hydronic water system supply and return piping (not located in the crawl space or pipe tunnels) shall be covered with Manville Micro-Lok or equal approved fiberglass insulation with all service (factory applied) vapor retardant jacket. Seal with type H mastic. All new or altered hydronic water system supply and return piping (located within the crawl space or pipe tunnels) shall be insulated with elastomeric type closed cell Armacel Armaflex Tubes pipe insulation or approved equal. The lining shall provide energy efficiency, indoor air quality and acoustic reducing properties and shall meet the Life Safety Standards as established by NFPA 90A and 9B and conform to the requirements of ASTM C 1071.
- B. Fittings shall be insulated with same material and thickness as adjoining pipe insulation and shall be pre-molded fittings or miter cut segmental insulation wired on. Over the fiberglass insulation, apply a wrapper of OCF glass cloth sealed with type H mastic. Apply aluminum bands on pipe covering in addition to self-sealing feature.
- C. Fiberglass Insulation Material: Molded fibrous glass insulation, density not less than 4 lbs. per cubic foot.
- D. Insulation Thickness: Shall be in accordance with the latest edition of the New York State Energy Conservation Construction Code.
- E. Fiberglass Insulation Jacket and Finish: White flame-retardant type, meeting all requirements of "Fire Hazard Classification" of NFPA, similar to "Fiberglass" Type FRJ, Insul-Coustic, Johns-Manville or approved equal.
- F. Insulation and Finishes for Fittings, Valves and Flanges
 - 1. Valves, fittings and flanges other than vapor seal insulation: Insulated in same manner and same thickness as piping in which installed.
 - 2. Use pre-molded sectional covering where available; otherwise use mitered segments of pipe covering.
 - 3. Obtain written approval prior to using other than molded sectional covering.
- G. Vapor seal Insulation for Valves, Fittings and Flanges: Same as above, except joints sealed with vapor barrier adhesive and wrapped with glass mesh tape. Each fitting shall be finished with two coats of vapor seal mastic adhesive.
- H. Jacket and Finishes: Exposed fittings - 6 oz. canvas jacket adhered with lagging adhesive.
- I. Concealed fittings: Standard weight canvas jacket adhered with lagging adhesive and with bands of 18-gauge copper coated steel - 2 bands at elbows, 3 at tee.
- J. Insulation at Pipe Hangers
 - 1. Where shields are specified at hangers on piping with fibrous glass covering, provide load bearing calcium silicate between shields and piping as follows:
 - a. For pipe covering without vapor barrier jacket, furnish at each shield 12" - long calcium silicate section with canvas section with canvas jacket continuous between shield and insulation.
 - b. For pipe covering with vapor barrier jacket, furnish at each shield 12" - long vapor barrier jacket section with section of fibrous glass replaced with section of calcium silicate. Vapor barrier jacket, continuous between shield and insulation for continuous vapor barrier.

- K. Condensate drain and refrigerant piping shall be insulated with 1/2" Imcosheild un-split polyolefin insulation.
- L. Equipment
 - 1. Secure fibrous glass block or board insulation in place with wire or galvanized steel bands.
 - a. Small Areas: Secure insulation with 16-gauge wire on maximum 6" centers.
 - b. Large Areas: Secure insulation with 14-gauge wire or .015" thick by 1/2" wide galvanized steel bands on maximum 10" centers. Stagger insulation joints.
 - c. Irregular Surfaces: Where application of block or board insulation is not practical insulate with insulating cement built-up to same thickness as adjoining insulation.
 - 2. Fill joints, voids, and irregular surfaces with insulating cement to a uniform thickness.
 - 3. Stretch wire mesh over entire insulated surface and secure to anchors with wire edges laced together.
 - 4. Apply finishing cement, total of 1/2" thick, in 1/4" thick coats. Trowel second coat to a smooth hard finish.
 - 5. Neatly bevel insulation around handholes, cleanouts, ASME stamp, manufacturer's nametag and catalog number.

2.4 PIPING (OUTDOOR)

- A. All supply and return hydronic piping shall be covered with 2" thickness insulation.
- B. Insulation shall be calcium silicate with aluminum jacket or elastomeric type closed cell Armacel Armaflex Tubes pipe insulation with weatherproof cladding or approved equal. Cladding composite membrane shall consist of a multiply embossed UV-resistant aluminum foil/polymer laminate to which is applied a layer of rubberized asphalt specially formulated for use on insulated piping applications. The rubberized asphalt acts as the substrate adhesive and provides the self-healing characteristics necessary to seal around punctures. Protecting the rubberized asphalt is an easily removed plastic release liner which gives its peel and stick functionality.
- C. Calcium silicate insulation shall conform with ASTM C 533, Type I, and shall be Manville "Thermo-12" or approved equal.
- D. Insulation jacket shall be 0.016-inch-thick aluminum for pipes 2-1/2 inches and larger, and 0.010-inch-thick for pipes 2 inches and smaller with a built-in isolation felt. All seams and joints shall be weatherproof.
- E. Refrigerant piping shall be insulated with 1/2" Imcosheild un-split polyolefin insulation.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories, and components.

- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed, and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt, and other foreign substances.

END OF SECTION

SECTION 23 0440

DAMPERS AND MISCELLANEOUS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

PART 2 - PRODUCTS

2.1 DAMPERS AND MISCELLANEOUS

- A. Furnish and install where shown on Drawings ARROW PIN-LOCK Dampers No. OBDPL-507 (Opposed) as manufactured by the Arrow Louver & Damper Corp. of Maspeth, NY 11378, or approved equal. Frames and blades to 1/8" extruded aluminum.
- B. Blades to be single unit PIN-LOCK design 6" wide, with the PIN-LOCK an integral section within the blade center axis. Frames to be a combination of 4" extruded aluminum channel and angle, with reinforcing bosses and groove inserts for vinyl seals.
- C. Pivot rods to be 1/2" diameter extruded aluminum, PIN-LOCK design interlocking into blade section. Bearings to be "Double-Sealed" type with Celcon inner bearing on rod riding in Merlon Polycarbonate outer bearing inserted in frame so that outer bearing cannot rotate.
- D. Blade linkage hardware is to be installed in angle or channel frame section out of air stream. All hardware to be of non-corrosive reinforced material or to be cadmium plated.
- E. Rod bearing to be designed for minimum air leakage by means of overlapping design and by extruded vinyl seals to fit into integral ribbed groove inserts in both frames and blades. All dampers in excess of 10 sq. ft. free area to have reinforced corners by means of gusset plates.
- F. Dampers shall be sized by the Control Manufacturer to properly control the flow of air and ensure minimum air stratification in mixing applications. Sizing shall be submitted for approval with information similar to that submitted on valve when sizing valve.

2.2 FIRE DAMPERS

- A. Dampers shall be multi blade construction UL labeled and be installed in accordance with UL 555, with breakaway connections. The units shall have stainless steel actuator springs with locking devices for horizontally mounted type.

2.3 COMBINATION FIRE / SMOKE DAMPERS

- A. Furnish and install at locations shown on Drawings, or as described in schedules, combination fire smoke dampers.
- B. Frame shall be a minimum of 16 gauge galvanized steel formed into a structural hat channel reinforced at corners for added strength. The blades shall be airfoil shaped single-piece hollow construction with 14 gauge equivalent thicknesses. Blade action shall be opposed. Bearings shall be stainless steel sleeve turning in an extruded hole in the frame for long life. Galvanized bearing shall not be acceptable.
- C. Blade edge seals shall be silicone rubber and galvanized steel mechanically locked into blade edge (adhesive or clip fastened seals shall be acceptable) and shall withstand a minimum of 450 degrees F. (232 degrees C.) Jamb seals shall be non-corrosive stainless steel flexible metal compression type to further ensure smoke management.

- D. Each combination fire/smoke damper shall be classified for use for fire resistance ratings of less than 3 hours in accordance with UL Standard 555, and shall further be classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems in accordance with the latest version of UL555S, and bear a UL label attesting to same. Damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers, required by this Specification. Testing and UL qualifying a single damper size is not acceptable. The leakage rating under UL555S shall be leakage Class I (4 c.f.m./sq. ft. at 1" w.g. and 8 c.f.m./ft. at 4" w.g.).
- E. As part of UL qualification, dampers shall have demonstrated a capacity to operate (to open and close) under HVAC system operating conditions, with pressures of at least 4" w.g. in the closed position, and 4000 f.p.m. air velocity in the open position.
- F. In addition to the leakage rating already specified herein, the dampers and their actuators shall be qualified under UL555S to an elevated temperature of 350 degrees F. (177 degrees C.). Appropriate electric actuators (equal to Ruskin model MA) shall be installed by the damper manufacturer at time of damper fabrication. Damper and actuator shall be supplied as a single entity, which meets all applicable UL555S qualifications for both dampers and actuators. Damper and actuator assembly shall be factory cycled 10 times to assure operation.
- G. Manufacturer shall provide factory assembled sleeve of 17" minimum length (Contractor to verify requirement). Factory supplied caulked sleeve shall be 20 gauge for dampers through 84" wide and 18 gauge above 84" wide.

PART 3 - EXECUTION

3.1 INSPECTION

- B. Inspect equipment space locations before beginning installation. Verify that the space is correct for entry and access. Do not proceed with installation of the equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of equipment, accessories and components.
- B. All heating, ventilating and air conditioning equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.

3.3 CLEANING

- A. Clean interior and exterior surfaces promptly after installation of equipment and components. Take care to avoid damage to protective coatings and finishes. Remove excess sealants, lubrication, dirt and other foreign substances.

END OF SECTION

SECTION 23 0460

AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 QUALIFICATIONS OF BIDDER

- A. The information for Bidders, General Clauses and Special Clauses apply to all Contractors for the project, shall apply to all work under this Section and will be adhered to by this Contractor and Sub-Contractors providing work included under this Section.
- B. This Contractor shall furnish an Electric/Electronic system of temperature controls as manufactured by Honeywell, Barber Coleman or approved equal. All temperature control wiring regardless of voltage shall be done by this Contractor. The abbreviation "ATCS" used hereinafter signifies "Automatic Temperature Control System."
- C. Provide all wiring (regardless of voltage), panels, transformers, devices, relays, switches, sensors, etc., to accomplish the sequences described hereinafter. The signal voltage for relays, etc., shall be 24 volt.
- D. The ATCS system shall be complete in all respects and will be installed by competent mechanics regularly employed by the ATCS Sub-Contractor/Vendor. The ATCS Vendor shall be an authorized representative of the controls manufacturer. All major control components shall be the products of one manufacturer.
- E. Complete control drawings shall be submitted and approved before field installation is started. The drawings shall give a complete description of all control elements and show all schematic piping and wiring. In addition, the submittal shall include manufacturer's data sheets on each control component and a sequence of operation, detailing the software logic of the system, and a complete hardware and software point list.
- F. All temperature sensing wells, pressure switch lappings and any other devices installed in steam pipe will be furnished by the ATCS Contractor.
- G. All electrical wiring, including but not limited to power, control and misc. conduit, connections, etc., required for the installation and operation of the ATCS, will be furnished and installed by the ATCS Contractor. All wiring shall be in rigid conduit where exposed and EMT conduit where concealed. All wiring must comply with national, state and local codes.
- H. The ATCS is intended to be completely electronic sensing with electrical actuation, employing stand-alone proportional, integral and derivative control action.
- I. Contractor shall furnish all necessary electrical controls, motor starters, switches, etc. for proper operation of equipment furnished by him under his Contract, and as herein noted.
- J. Motor starters shall have a spare set of dry contacts for connection to the fire alarm system by the Electrical Contractor for smoke control override.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Immersion Temperature Sensors: The immersion temperature sensors shall be moisture/waterproof, 4 7/8" 304 stainless tube and brass fitting. The 1/2" NPT female threaded brass fitting shall be equipped with a greenfield connector. The sensor shall also have 1/8" NPT male threads for installing into a brass thermowell. The thermowell shall be capable of screwing into a 1/2" NPT theodolite fitting and withstand a maximum temperature of 250 degrees F., and a maximum static pressure of 250 p.s.i.g. The operating range of the sensor shall be 10 degrees F. to 230 degrees F. The active sensing element shall be highly stable, precision thermistor material (Type III), accurate to within plus or minus 36 degrees F., with a stability of 24 degrees F over five years. The sensors shall produce 10,000 Ohms at 77 degrees F. An appropriation amount of thermal compound shall be supplied with each immersion temperature sensor.
- B. Duct Temperature Sensor: The duct temperature sensors shall have a sensing element sealed in a conductive compound within a 7" long stainless steel tube, attached to a 4" electrical strap - by an insulating nylon fitting. The nylon fitting will be equipped with 1/2" NPT female conduit fitting and a 1/8" NPS male fitting. The sensors shall be waterproof and can withstand operating temperatures from 32 degrees F. to 160 degrees F. Sensor accuracy must be within +/- .36 degrees F.
- C. Outside Air Temperature Sensor: The outside air temperature sensor shall be constructed of type III thermistor material, sheathed in a stainless steel tube and mounted inside a ventilated, treated white PVC sunshield. The sunshield and sensor assembly shall be mounted on a weatherproof outlet box. The operating range of the outside air temperature sensor shall be from minus 30 degrees F to 140 degrees F, accurate to within plus or minus 36 degrees F., with a stability of 24 degrees F over five years. The sensor shall produce a reading of 10,000 Ohms at 77 degrees F.
- D. Relays: The 24 VAC coil relays shall have 10 amp rated silver DPDT contacts, pin type terminals and be UL recognized. The contact mechanism shall be capable of operating between 80% consumption shall not exceed 2.5 VA. The life expectancy shall be over 500,000 electrical operations and 10,000 mechanical operations. Pin type socket brass with screw terminals and 24 VAC varistors shall be supplied with each relay.
- E. Damper Actuators: The 24 VAC actuators shall be spring return type and shall be sized for torque required at load conditions. Temperature rating -22 degrees F. to +122 degrees F.
- F. Transformers: The 120 to 24 VAC transformers shall be sized to match the load of the field components, plus 10%. The transformers shall be equipped with spade connectors and inline fuses, as well as 24 VAC varistors across the secondary terminals.
- G. Control Valves
 - 1. 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. All valves shall be capable of operating at varying rates of speed to correspond to the exact dictates of the controller and variable load requirements.
 - 2. Where valves operate in sequence with other valves or damper operators, provide on each valve a pilot positioner to provide adjustable operating ranges and starting points and positive close off at the required control signal. Positioners must be directly connected to the valve stem. Ratio relays are not acceptable.

3. Valves shall be sized by the Temperature Control Manufacturer and guaranteed to meet the heating requirements as specified and indicated on the drawings. Unless otherwise specified, all shall conform to the requirements herein specified for the piping system in which they are installed.

2.2 ENCLOSURES

- A. All control components shall be mounted in NEMA-1, lockable, hinged enclosures.

PART 3 – EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

- A. General: The Contractor or a Sub-Contractor shall perform installation of the building automation system. However, all installation shall be under the personal supervision of the Contractor. The Contractor shall certify all work as proper and complete. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a Sub-Contractor.
- B. Demolition: Remove controls, which do not remain as part of the building automation system, all associated abandoned wiring and conduit and all associated pneumatic tubing. The Owner will inform the Contractor of any equipment, which is to be removed, that will remain the property of the Owner. The Contractor will dispose of all other equipment that is removed.
- C. Access to Site: Unless notified otherwise, entrance to building is restricted. No one will be permitted to enter the building unless their names have been cleared with the Owner or the Owner's representative.
- D. Code Compliance: All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations. Should any discrepancy be found between wiring Specifications in Division 17 and Division 16, wiring requirements of Division 17 will prevail for work specified in Division 17.
- E. Cleanup: At the completion of the work, all equipment pertinent to this Contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this Contract. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

3.2 WIRING, CONDUIT, TUBING AND CABLE

- A. All wire will be copper and meet the minimum wire size and insulation class listed below:

Wire Class	Wire Size	Isolation Class
Power	12 Gauge	600 Volt
Class One	14 Gauge Std.	600 Volt
Class Two	18 Gauge Std.	300 Volt
Class Three	18 Gauge Std.	300 volt
Communications	Per Mfr.	Per Mfr.

- B. Power and Class One wiring may be run in the same conduit. Class Two and Three wiring and communications wiring may be run in the same conduit.
- C. Where different wiring classes terminate within the same enclosure, maintain clearances and install barriers per the National Electric Code.

- D. Where wiring is required to be installed in conduit, EMT shall be used. Conduit shall be minimum 1/2 inch galvanized EMT. Setscrew fittings are acceptable for dry interior locations. Watertight compression fittings shall be used for exterior locations and interior locations subject to moisture. Provide conduit seal off fitting where exterior conduits enter the building or between areas of high temperature/moisture differential.
- E. Flexible metallic conduit (max. 3 feet) shall be used for connections to motors, actuators, controllers, and sensors mounted on vibration producing equipment. Liquid-tight flexible conduit shall be use in exterior locations and interior locations subject to moisture.
- F. Junction boxes shall be provided at all cable splices, equipment termination, and transitions from EMT to flexible conduit. Interior dry location J-boxes shall be galvanized pressed steel, nominal four-inch square with blank cover. Exterior and damp location JH-boxes shall be cast alloy FS boxes with threaded hubs and gasket covers.
- G. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Teflon wiring can be run without conduit above suspended ceilings. EXCEPTION: Any wire run in suspended ceilings that is used to control outside air dampers or to connect the system to the fire management system shall be in conduit.
- H. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.
- I. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140. Only glass fiber is acceptable, no plastic.
- J. Fiber optic cable shall only be installed and terminated by an experienced contractor. The BAS contractor shall submit to the Engineer the name of the intended contractor of the fiber optic cable with his submittal documents.

3.3 HARDWARE INSTALLATION

- A. Installation Practices for Wiring and Tubing
 - 1. All controllers are to be mounted vertically and per the manufacturer's installation documentation.
 - 2. The 120VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run will include a separate hot, neutral, and ground wire. The ground wire will terminate at the breaker panel ground. This circuit will not feed any other circuit or device.
 - 3. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.
 - 4. Wires are to be attached to the building proper at regular intervals such that wiring does not drop. Wires are not to be affixed to or supported by pipes, conduit, etc.
 - 5. Conduit in finished areas will be concealed in ceiling cavity spaces, plenums, and furred spaces and wall construction. Exception: metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.
 - 6. Conduit, in non-finished areas where possible, will be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.
 - 7. Wires are to be kept a minimum of three (3) inches from hot water or condense piping.
 - 8. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.
 - 9. Wire will not be allowed to run across telephone equipment areas.
- B. Installation Practices for Field Devices
 - 1. Well-mounted sensors will include thermal conducting compound within the well to insure good heat transfer to the sensor.

2. Actuators will be firmly mounted to give positive movement and linkage will be adjusted to give smooth continuous movement throughout 100 percent of the stroke.
3. Relay outputs will include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.
4. Water line mounted sensors shall be removable without shutting down the system in which they are installed.
5. For duct static pressure sensors, the high-pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low-pressure port shall be left open to the plenum area at the point that the high-pressure port is tapped into the ductwork.
6. For building static pressure sensors, the high-pressure port shall be inserted into the space via a metal tube. Pipe the low-pressure port to the outside of the building.

C. Enclosures

1. For all I/O requiring field interface devices, these devices, where practical, will be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure, which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.
2. FIP's shall contain power supplies for sensors, interface relays and Contractors, safety circuits, and I/P transducers.
3. The FIP enclosure shall be of steel construction with baked enamel finish; NEMA 1 rated with a hinged door and keyed lock. The enclosure will be sized for 20% spare mounting space. All locks will be keyed identically.
4. All wiring to and from the FIP will be to screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.
5. All outside mounted enclosures shall meet the NEMA-4 rating.
6. The tubing and wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

D. Identification

1. Identify all control wires with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with As-Built Drawings.
2. Identify all pneumatic tubing with labeling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with As-Built Drawings.
3. All field enclosures, other than controllers, shall be identified with a Bakelite nameplate. The lettering shall be in white against a black or blue background.
4. Junction box covers will be marked to indicate that they are a part of the BAS system.
5. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with nameplates.
6. All I/O field devices inside FIP's shall be labeled.

E. Location

1. The location of sensors is per Mechanical and Architectural Drawings.
2. Space humidity or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.
3. Outdoor air sensors will be mounted on the north building face directly in the outside air. Install these sensors such that the effects of heat radiated from the building or sunlight is minimized.
4. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

3.4 COMMISSIONING AND SYSTEM STARTUP

- A. Point-to-Point Checkout
Each I/O device (field mounted as well as those located in FIP's) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the Owner or Owner's representative.
- B. Controller and Workstation Checkout:
A field checkout of all controllers and front-end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the Owner or Owner's representative by the completion of the project.
- C. System Acceptance Testing
 - 1. All application software will be verified and compared against the sequences of operation. Control loops will be exercised by inducing a setpoint shift of at least 10% and observing whether the system successfully returns the process variable to setpoint. Record all test results and attach to the Test Results Sheet.
 - 2. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e., graphic panels are invoked, reports are generated, etc.). Submit a Test Results Sheet to the Owner.
 - 3. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the Owner.
 - 4. Perform an operational test of each third-party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.

3.5 SEQUENCES OF OPERATION

- A. Steam Convectors (Existing)
 - 1. Point List
 - a. Space Temperature (Wall thermostat)
 - b. Valve Modulation
 - 2. Sequence of Operation
 - a. Unoccupied Mode: Modulate control valve to maintain night setback temperature set-point (adjustable).
 - b. Occupied Mode: Modulate control valve to maintain daytime temperature set- point (adjustable).

B. Exhaust Fans (Rooftop EF-1, EF-2)

1. Point List
 - a. Fans Start/Stop (Electronic time clock)
2. Sequence of Operation
 - a. Unoccupied Mode: Fans Off, Dampers Closed.
 - b. Occupied Mode: Fans On, Dampers Open.

C. Ductless Split Systems (CU-1, CU-2)

1. Point List
 - a. System Start/Stop (Wall thermostat)
 - b. Heating/cooling Mode
 - c. Room Temperature
2. Sequence of Operation
 - a. All Modes: Systems serving Data Rooms shall operate continuously.

3.7 TRAINING

- A. The Contractor shall supply personnel to train key customer personnel in the operation and maintenance of the installed system. The training program shall be designed to provide a comprehensive understanding and basic level of competence with the system. It shall be sufficiently detailed to allow customer personnel to operate the system independent of any outside assistance. On-line context sensitive HELP screens shall be incorporated into the system to further facilitate training and operation.
- B. The training plan shall include detailed session outlines and related reference materials. The customer personnel shall be able to utilize these materials in the subsequent training of their co-workers.
1. Training time shall not be less than a total of 40 hours, and shall consist of:
 - a. 16 hours during normal day shift periods for system operators. Specific schedules shall be established at the convenience of the customer.
 - b. 24 hours of system training shall be provided to customer supervisory personnel so that they are familiar with system operation.
 - c. The specified training schedule shall be coordinated with the customer and will follow the training outline submitted by the Contractor as part of the submittal process.
 - d. Provide an as built Video training tape, showing & explaining all animated graphics in detail, all controllers and equipment the FMS operates. (Four (4) Copies shall be supplied)
 - e. If further training is needed, the Contractor shall provide another 40 hours at no extra cost.
 2. All training sessions shall be scheduled by the Construction Manager. The Contractor shall provide sign-in sheets and distribute minutes of each session prior to the subsequent session. This documentation shall be included in the Operation and Maintenance manuals

END OF SECTION

SECTION 23 0470

TESTING, START-UP AND ADJUSTMENTS

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 TESTING, START-UP AND ADJUSTMENTS

- A. Furnish all materials, supplies, labor and power required for testing. Make preliminary tests and prove work satisfactory. Notify Architect and all authorities having jurisdiction in ample time to be present for final testing of all piping. Test before insulating or concealing any piping. Repair defects disclosed by tests, or if required by Architect, replace defective work with new work without additional cost to Owner. Make tests in stages if so, ordered by Architect to facilitate work of others. Use of wicking in tightening leaking joints not permitted.
- B. HVAC Contractor is responsible for work of other trades disturbed or damaged by tests and/or repair and replacement of his work, and shall cause work so disturbed or damaged to be restored to its original condition at his own expense.
- C. Unless otherwise specified, all piping systems shall be hydrostatically tested to 150 psig. Tests shall be of four (4) hour duration during which time piping shall show no leaks and during time no sealing of leaks will be permitted.
- D. HVAC Contractor shall balance out system and submit test reports showing operating data to include the following:
 - 1. C.F.M. of all air handling equipment.
 - 2. C.F.M. at each air outlet.
 - 3. G.P.M. for equipment.
 - 4. R.P.M. for each fan and fan motor.
 - 5. Motor power consumption.
 - 6. Air temperature readings before and after coils.
 - 7. Water temperature readings in and out of coils and through equipment.
 - 8. Pressure gauge readings before and out of all pertinent equipment.
- E. If the performance of the systems does not conform to the design parameters, the Contractor shall return to the site until the systems perform as designed.
- F. HVAC Contractor shall furnish services of qualified personnel, thoroughly familiar with job, to operate and make all adjustments so that system and control equipment shall operate as intended. This shall include adjustment/replacement of sheaves/impellers to achieve design performance. Adjustments shall be made including balancing of water and air systems in cooperation with qualified representatives of mechanical equipment manufacturers and temperature control manufacturer. This shall include any required adjustment/replacement of sheaves, belts, impellers, etc. to achieve design performance. Architect/Engineer is to be notified when this balancing is to be performed.
- G. When all work is in an acceptable operating condition, furnish operating and maintenance manuals as specified in General Requirements.
- H. All HVAC equipment shall be carefully designed, constructed and installed so as to prevent any objectionable noise or vibration reaching any part of the building outside of the mechanical equipment room. Care shall also be taken to prevent transmission of noise or odor through ductwork into other spaces.

- I. Contractor shall include in his Bid, adjustment of air quantity below scheduled C.F.M. for air systems deemed “noisy” by Owner subsequent to initial balancing.
- J. The Contractor shall be required to rectify or replace at his own expense, any equipment not complying with the foregoing requirements.
- K. Final inspection and approval shall be made only after proper completion of all of above requirements.

END OF SECTION

SECTION 23 0480

GENERAL LABELING, VALVE CHARTS AND PIPING IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GENERAL LABELING AND VALVE CHARTS

- A. This Contractor shall have appropriate descriptive labels, identification tags and nameplates of equipment, valves, etc. furnished and installed under this Contract and shall be properly placed and permanently secured to (or adjacent to) the item being installed. All such labels, identifications, tags, nameplates, etc. shall be selected by the Architect/Engineer.
- B. In general, labels shall be the lamacoid type of sufficient size to permit easy identification, black coated, white edged, with letters 3/16" high. Major equipment, apparatus, control panels, etc. shall have 8" x 4" lamacoid plates with lettering of appropriate size.
- C. Provide tags for all valves, automatic and manual dampers. Tags shall be Type #2020 anodized aluminum of #1420 lamacoid engraved. Tags may not necessarily be standard. Fasten tags to valve or damper with brass chain.
- D. All nameplates, labels, identifications and tags shall be as manufactured by the Seton Name Plate Co., of New Haven, CT or approved equal. Submit complete schedules, listings and descriptive data together with samples for checking and approval before purchasing. Labeling shall include the "number" of the equipment, valve, dampers, switch, etc. and service of the valve.
- E. Mount on laminated plastic boards with transparent surface all valves, wiring diagrams, control diagrams, instruction charts, permits, etc. Valve chart shall be non-fading with original copies laminated.

1.2 IDENTIFICATION OF PIPING

- A. This Contractor shall provide on all piping, semi-rigid, wrap around plastic identification markers equal to Seton Snap-Around and/or Seton Strap-On pipe markers.
- B. Each marker background is to be appropriately color coded with a clearly printed legend to identify the contents of the pipe. Directions of flow arrows are to be included on each marker.
- C. Identification of all piping shall be adjacent to each valve, at each pipe passage through wall, floor and ceiling construction and at each branch and riser take-off.
- D. Identification shall be on all horizontal pipe runs, marked every 15 ft. as well as at each inlet outlet of equipment.

END OF SECTION

SECTION 23 0490

GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GUARANTEE

- A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with the guarantee provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace, and/or repair any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION

SECTION 26 0100

GENERAL CONDITIONS

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section.

1.1 DESCRIPTION OF WORK

- A. It is the intention of the Specification and Drawings to call for finish work, tested and ready for operation.
- B. Any apparatus, appliance material or work not shown on the Drawings but mentioned in the Specifications, or vice versa, or any incidental accessories or ancillary devices necessary to make ready for operation even if not particularly specified, shall be furnished, delivered and installed under their respective Division without additional expense to the Owner.
- C. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the work as though they were hereinafter specified or shown.
- D. Work under each section shall include giving written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules and regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that work under each section has included the cost of all necessary items for the approved satisfactory functioning of the entire system without extra compensation.
- E. Small scale drilling through walls and floors which may contain asbestos shall be performed by a person with a "restricted asbestos handler allied trades certificate" and shall have a copy of it in his possession at all times while working of the project.

1.2 DRAWINGS

- A. Drawings are diagrammatic and indicate the general arrangement of the system and work included in the Contract. (Do not scale the drawings). Consult the Architectural Drawings and details for exact location of fixtures and equipment; where same are not definitely located, obtain this information from the general construction supervisor.
- B. Work under each section shall closely follow Drawings in layout of work; check Drawings of other Divisions to verify spaces in which work will be installed. Maintain maximum headroom; do not begin work until unsatisfactory conditions are corrected.
- C. Make reasonable modifications in the layout as needed to prevent conflict with work of other Sections of the Specifications or for proper execution of the work.
- D. It shall be understood that the right is reserved by the Architect/Engineer to change the location of equipment and apparatus to a reasonable extent as building conditions may dictate, prior to their installation without extra cost to the Owner.

1.3 SURVEYS AND MEASUREMENTS

- A. Base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
- B. Before proceeding with the work resolve discrepancies between actual measurements and those indicated, which prevent following good practice or intent of the Drawings or Specifications.

1.4 CODES AND STANDARDS

- A. The Codes and Standards listed below apply to all Electrical work codes or standards that are mentioned in these Specifications; the latest edition or revision shall be followed:
 - 1. NEMA - Standards
 - 2. ANSI CI - National Electrical Code (NFPA 70)
 - 3. ANSI C50.13 - Rotating Electrical Machinery
 - 4. NEMA MG2 - Construction and guide for selection, installation and use of electric motors.
 - 5. NEMA MG1 - Motors and Generators
- B. The following State and Local Codes shall apply: New York State Uniform Fire Prevention and Building Code, and Local Building Codes.
- C. The following abbreviations are used within this Division of the Specifications:
 - 1. IES - Illuminating Engineering Society.
 - 2. NEC - National Electrical Code
 - 3. ANSI - American National Standards Institute
 - 4. ASTM - American Society for testing and materials
 - 5. EPA - Environmental Protection Agency
 - 6. IEEE - Institute of Electrical and Electronic Engineers
 - 7. NEMA - National Electrical Manufacturers Association
 - 8. NFPA - National Fire Protection Association.
 - 9. OSHA - Occupational Safety and Health Administration
 - 10. UL - Underwriter's Laboratories

1.5 PERMITS AND FEES

- A. Give all necessary notices, obtain all permits, and pay all Government and State sales taxes and fees where applicable, and other costs, including utility connections or extensions in connection with work of this Division. File all necessary plans, prepare all documents, and obtain all necessary approvals of all Governmental and State departments having jurisdiction; obtain all necessary certificates of inspections for his work and deliver a copy to the Architect before request for acceptance and final payment for the work. Pay fees for utility construction/connections.
- B. Include in the work, without extra cost to the Owner, any labor, materials, services, and apparatus, Drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on the Drawings and/or specified.
- C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with the requirements of the local utility companies, with the recommendations of fire insurance rating organization having jurisdiction and with the requirements of all governmental departments having jurisdiction.
- D. All materials and equipment for the electrical portion of the mechanical systems shall bear the approval label of or shall be listed by the Underwriter's Laboratories, Inc.

1.6 TEMPORARY LIGHT AND POWER

- A. The Contractor shall furnish, install, maintain and, upon direction to do so, remove system of temporary lighting and power for the use of all construction trades.
- B. The Electrical Contractor shall provide adequate electrical service for the needs of all Contracting Trades.

- C. Wiring shall be provided for temporary use during building construction, including grounding, and fused main cut-off switches. Temporary electric lines with branch switches shall be provided for lighting and for taps for electric tools, pumps, and other temporary equipment; all connected to a main line looped through floor spaces and up stair wells or shafts. All power outlets shall be grounded to an equipment ground wire in an approved manner. Electric lines shall be extended to power tools, which cannot be located within reach of extension cords.
- D. Light bulbs shall be provided in sufficient quantity to light the building for safety purposes. Extension cords shall be provided as may be essential to the proper execution of the work. Temporary lighting shall be provided for all stairs and other locations where needed for safety or the proper execution of the work.
- E. The Electrical Contractor shall maintain temporary lighting and power systems in good working condition, including the relocation and reinstallation when required to avoid interference with the progress of construction.
- F. Provide ground-fault personnel ampere protection for all single phase, 15 and 20 ampere receptacles. All receptacles and portable cord connectors shall have NEMA standard locking type configurations.
- G. The Electrical Contractor shall turn lights on and off at the beginning and end of each working day of any trade unless otherwise directed. He shall arrange for all temporary light and power for all trades which do not have holidays (days off) similar to the electrical trade. The Electrical Contractor shall patch and repair all openings left damaged by the installation and removal of the temporary light and power.

1.7 MANUFACTURER'S IDENTIFICATION

- A. Manufacturer's nameplate, name or trademark and address shall be attached permanently to all equipment and materials furnished under this Division. The nameplate of a contractor or distributor may not be used.

1.8 SHOP DRAWINGS

- A. Submit for approval detailed shop drawings of all equipment and materials in accordance with working procedures.
- B. Furnish all necessary templates and patterns for installation work and for the purpose of making adjoining work conform; furnish setting plans and shop details to other trades as necessary.
- C. Submit shop drawings for the following:
 - 1. Light Fixtures.
 - 2. Receptacles, Switches, Occupancy Sensors.
 - 3. Overcurrent Protective Devices.
 - 4. Panelboards.
 - 5. Public Address system.
 - 6. Fire Alarm system components.

1.9 MATERIALS AND WORKMANSHIP

- A. All materials and apparatus necessary for the work, except as specifically indicated otherwise, shall be new, of first-class quality and shall be furnished, delivered, erected, connected and finished in every detail and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as accepted by the Architect shall be furnished.
- B. Furnish the services of an experienced Superintendent who shall be constantly in charge of the installation of the work, together with all skilled workmen, helpers, and labor to unload, transfer, erect, connect up, adjust, start, operate and test each system.

- C. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.10 PROTECTION

- A. Work under each Section shall include protecting the work and materials of all other Sections from damage from work or workmen and shall include making good all damage thus caused. Be responsible for work and equipment until finally inspected, tested, and accepted; protect work against theft, injury or damage; and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing or other foreign material.
- B. Work under each section includes receiving, unloading, uncrating, storing, protecting, setting in place, and connecting up completely of any equipment supplied under each section. Work under each section shall also include exercising special care in handling and protecting equipment and fixtures and shall include the cost of replacing any of the above equipment and fixtures which are missing or damaged by reason of mishandling or failure to protect on the part of the Contractor.

1.11 BASES AND SUPPORTS

- A. Unless specifically noted otherwise, provide all necessary supports, pads, bases, and piers required for all equipment under this Division. Provide all temporary bases and supports as required.
- B. All equipment, unless shown otherwise, shall be securely attached to the building structure. Attachments shall be of a strong and durable nature; any attachments that are, insufficient, shall be replaced as directed by the Architect.

1.12 SLEEVES, INSERTS AND ANCHOR BOLTS

- A. All conduits passing through floors, walls or partitions shall be provided with sleeves having an internal diameter one inch larger than the outside diameter of the conduit, or insulation enclosing the conduit.
- B. Furnish all sleeves, inserts, and anchor bolts necessary to be installed under other sections of the Specifications to accommodate work of this section.
- C. Sleeves through outside walls shall be cast iron sleeves with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The remaining space shall be packed with oakum to within 2 inches of each face of the wall. The remaining shall be packed and made watertight with a waterproof compound.
- D. Sleeves through concrete floors or interior masonry walls shall be schedule 40 black steel pipe, set flush with finished walls or ceiling surfaces but extending 2 inches above finished floors.
- E. Sleeves through interior partitions shall be 22-gauge galvanized sheet steel, set flush with finished surfaces or partitions.
- F. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4" inch diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods up to 1/2" diameter to be passed through the insert body. Strip inserts shall have attached rods having hooked ends to allow fastening to reinforcing rods. Inserts shall be as manufactured by Carpenter and Patterson, Inc. or Grinnell Co., Inc.
- G. Penetrations through fire-rated walls, ceilings and floors in which cables, conduits pass, shall be sealed by a UL approved fire stop fitting classified for an hourly rating equal to the fire rating of the floor, wall or ceiling shall be Gedney Fire Seal Type CFSF of CAPS.

1.13 PAINTING

- A. All finish painting in finished areas shall be performed by others.
- B. All materials shipped to the job site under the Division, such as panels and plates, shall have a prime coat and standard manufacturer's finish unless otherwise specified.
- C. Inaccessible conduits, hangers, supports and anchors and ducts shall be coated prior to installing.
- D. All components of the fire alarm system raceway shall be painted red. This includes but is not limited to conduit, junction boxes, pull boxes.

1.14 CUTTING AND PATCHING

- A. All cutting and patching required for the work of this Division shall be done by this Division.
- B. Work under this Division shall include furnishing, locating, and setting inserts and/or sleeves. Do all drilling and cutting necessary for the installation.
- C. All holes cut through concrete slabs and structural steel shall be punched or drilled from the underside. No structural member shall be cut without the written acceptance of the Architect and all such cutting shall be done in a manner directed by him.
- D. Refer to Division 1 for additional requirements.

1.15 SCAFFOLDING, RIGGING, HOISTING

- A. Furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished under this Division. Remove same from premises when no longer needed.

1.16 EXCAVATING AND BACKFILLING

- A. All excavation and backfilling for the work of this Division shall be performed by Division 2.

1.17 WATERPROOFING

- A. Where any work penetrates waterproofing, including waterproof concrete and floors in wet areas. Submit proposed method of installation for review by the Architect before beginning work. Furnish all necessary sleeves, caulking and flashing necessary to make opening absolutely watertight.

1.18 ACCESSIBILITY AND ACCESS PANELS

- A. Be responsible for the sufficiency of the size of shafts and chases, the adequate thickness of partitions, and the adequate clearance in double partitions and hung ceilings for the proper installation of the work of this Division.
- B. Locate all equipment, which must be serviced, operated, or maintained in fully accessible positions. Minor deviations from Drawings may be allowed for better accessibility with approval of the Architect.

1.19 SHUTDOWNS

- A. When installation of a new system necessitates the temporary shutdown of an existing utility operating system the connection of the new system shall be performed at such time as designated by and in consultation with the Utility Company. Work required after normal business hours shall be done so at no additional cost to the Owner.

1.20 CLEANING

- A. Thoroughly clean all equipment of all foreign substances inside and out before being placed in operation.
- B. If any foreign matter should stop any part of a system after being placed in operation, the system shall be disconnected, cleaned, and reconnected whenever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.
- C. Upon completion of work remove from the premises all rubbish, debris, and excess materials. Any oil or grease stains on floor areas caused by work of this Division shall be removed and floor areas left clean.

1.21 RECORD DRAWINGS

- A. Maintain at the job site a record set of Electrical Drawings on which any changes in location of equipment, panels, devices, and major conduits shall be recorded. Indicate dimensions of all items installed underground or in concrete.

1.22 OPERATING INSTRUCTIONS

- A. Upon completion of all work and all tests, the Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period specified under each applicable Section of this Division. During this period, he shall instruct the Owner or his representative fully in the operation, adjustment and maintenance of all equipment furnished. Give at least 7 days' notice to the Owner in advance of this period.
- B. Furnish four complete bound sets for delivery to the Architect of typewritten or blueprinted instructions for operating and maintaining all systems and equipment included in this Division. All instruction shall be submitted in draft for review prior to final issue. Manufacturer's advertising literature or catalogs may not be used for operating and maintenance instruction.
- C. In the above-mentioned instructions, include the maintenance schedule for the principal items of equipment furnished under this Division.
- D. The manufacturer shall attest in writing that his equipment has been properly installed prior to start. The following is some of the equipment necessary for this inspection: fire alarm system. These letters will be bound into the operating and maintenance books.

1.23 ADJUSTING AND TESTING

- A. After all equipment and accessories to be furnished are in place, they shall be put in final adjustment and subjected to such operating tests as will assure the Architect that they are in proper adjustment and in satisfactory permanent operating condition.
- B. This particular work shall include the services of a factory engineer to inspect the installation and assist in the initial startup and adjustment to the equipment. The period of these services shall be for such time as necessary to secure proper installation and adjustments. After the equipment is placed in permanent operation, there shall be furnished the service of said engineer for the purpose of supervising the initial operation of the equipment and to instruct the personnel responsible for operation and maintenance of the equipment.
- C. At the completion of the job when all panels, devices, etc. are at full working load the Contractor shall provide infrared scan thermographic inspection test of all connection points, terminals, etc. of wires #8 AWG and larger to detect "hot-spots" in the electrical current flow. Correct all hot spots.

1.24 UNDERWRITER'S LABEL

- A. All electrical equipment and materials shall be new and shall comply with the standards of and shall bear the label of the Underwriter's Laboratories.

1.25 ELECTRICAL SAFETY INSPECTION

- A. Electrical Contractor shall arrange for an Electrical Safety Inspection to be performed by the Local Inspection Agency (i.e.: New York Electrical Inspection Services, Atlantic Inland, Middle Department Inspection Agency). A Certificate of Compliance "Underwriter's Certificate" shall be issued to the Owner. All costs and coordination required shall be included in this Contractors Base Bid.

1.26 REMOVALS

- A. The scope of removals shown on the Drawings are diagrammatic only and indicate the intent of the work to be performed and not the complete scope of demolition and/or removal work. It shall be the responsibility of this Contractor to remove any electrical devices even if not specifically indicated to be removed on these Drawings in order to accommodate new work.
- B. All power conductors, control wiring and conduit associated with mechanical equipment such as fans, pumps, etc. designated for removal on the HVAC Drawings shall be removed clear back to the source of power and disconnected. All motor starters, disconnect switches, control devices, etc. shall be removed. Refer to HVAC Drawings for extent of HVAC removals.
- C. Any device removed shall include (but shall not be limited to) the removal of all associated wiring, conduit, boxes, and auxiliary devices back to the previous device on the circuit, or back to the panelboard or origin of the circuit or any other items that are not incorporated in new layout, until such removal is complete. If the removal of any device interrupts service of any other device that is to remain, the Contractor shall provide all materials and labor to ensure continuity of service to those devices to remain.
- D. Junction boxes, pull boxes, wireways, conduits, or any other devices required to reconnect circuitry shall be installed concealed within the ceilings, partitions and/or walls, floors, no surface or exposed circuiting shall be permitted, unless specifically indicated.
- E. The Electrical Contractor shall patch all openings in walls, ceilings or roof that are left open as a result of removals. Refer to cutting and patching section. Any electrical device removed including but not limited to disconnect switches, panelboards, etc. shall be cleaned, protected and turned over to the Owner or disposed of as directed by Owner.

END OF SECTION

SECTION 26 0125

SCOPE OF WORK

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 SCOPE OF WORK

- A. The work under this section includes all labor, materials, equipment, tools, transportation and the performance of all work necessary and required for furnishing and installing all Electrical work shown on the Contract Documents, as specified herein and as otherwise required by job conditions or reasonably implied, including, but not necessarily limited to the following:
1. The addition of new fire alarm devices (i.e., automatic fan shutdown, for new HVAC equipment) and the replacement of the existing ones as shown on Drawings.
 2. The contractor shall dispose of all debris, including but not limited to fixtures, equipment, lamps, ballast, wiring devices and the like in accordance with, as defined by governing law and regulations of the jurisdiction where the work is being performed.
 3. The addition of new public address speakers to the existing ones as shown on drawings.
 4. Modifications to existing electrical distribution system as indicated on the Drawings.
 5. Circuit breaker panelboards, feeder, conduit, cables and branch circuit wiring with all connections complete.
 6. Conduit, conduit fittings, junction and pull boxes and all appurtenances necessary for the raceway systems including necessary supports and fasteners.
 7. Electrical conductors, connectors, fittings and connection lugs.
 8. Branch circuit devices, outlet boxes, pull boxes, motor disconnect switches, etc.
 9. Power wiring to HVAC and Plumbing equipment including disconnect switches as shown and/or required by NEC.
 10. Empty conduit for computer and telephone.
 11. Lighting fixtures and lamps including site lighting and occupancy sensor.
 12. Core drilled holes for conduit passing through walls, ceilings, and floors.
 13. All necessary cutting, patching and core drilling incidental to the electrical work.
 14. Grounding as required as per NEC.
 15. Sleeves for conduit and watertight caulking between conduit and sleeve.
 16. Testing.
 17. Cutting, patching and drilling.

- B. Coordination Drawings (if applicable): Attention is directed to Division 1 for coordination drawing requirements for this project. These drawings are critical to the proper execution of the work and failure to honor these requirements may become the basis for denial of any and all claims for either or both “time” and “money”.

1.2 WORK NOT INCLUDED

- A. The following related items will be done by others:

1. Furnishing motors and controllers.
2. Concrete work.
3. Excavation and backfill.

END OF SECTION

SECTION 26 0150

APPROVED MANUFACTURERS

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 APPROVED MANUFACTURERS

A. The following list of manufacturers constitutes an approved list:

- | | | |
|-----|--------------------------|---|
| 1. | Panelboards | Siemens, Square D, GE |
| 2. | Disconnect Switches | Siemens, Square D, GE |
| 3. | Conduit (steel) | Walker, Youngstown, Steelduct, Triangle |
| 4. | Conduit Fittings (steel) | Appleton, Crouse-Hind, O-Z, T & B, M & W |
| 5. | Wire and Cable | General, South Wire, Triangle, Rome, Hatfield, Crescent, Cerro |
| 6. | Splicing Connectors | 3M, O-Z, Thomas & Betts |
| 7. | Outlet Boxes | Appleton, National, Steel City, Raco |
| 8. | Wiring Devices | Arrow-Hart, Hubbell, P & S |
| 9. | Fuses | Bussman, Ferraz-Shawmut, Littlefuse |
| 10. | Motion Sensors | Watt Stopper, Sensorswitch |
| 11. | Fire Alarm System | Simplex, Pyrotronics or approved equal
Edwards System Technologies or approved equal |
| 12. | Public Address System | Rauland-Borg, Bogen or approved equal |

- B. All materials and appliances shall have listing of Underwriters Laboratories, Inc. and be so labeled, or shall conform to their requirements, in which case certified statements to that effect shall be furnished by the manufacturer with a copy of an examination report by a recognized independent testing laboratory acceptable to the Architect and his Engineer. Use new materials and appliances throughout.
- C. Where several types or makes of materials are specified, the Contractor has the option of using any of these, but after a type or make has been selected and has received the approval of the Architect, it shall be used throughout.
- D. The Contractor shall provide all structural supports for the proper attachment of equipment supplied by him and also for all equipment supplied to him under other sections of the Specifications for mounting and connections.
- E. Secure all equipment to the building structure independently. Do not secure to work of other trades such as ceiling lath, piping racks, etc., unless specified or noted otherwise.

- F. Wall mounted equipment shall be directly secured to wall by means of steel bolts. Maintain at least 1/4" air space between equipment and supporting wall. Pre-fabricated steel channels providing a high degree of mounting flexibility, such as those manufactured by Kindorf and Unistrut, shall be used for mounting arrays of equipment.
- G. All fastening, supports, hangers, anchors, etc., shall be of a type made for the specific purpose. On masonry walls, metallic expansion shield and machine screws shall be used. Screws with wooden plugs or anchors will not be acceptable on any part of the work.

END OF SECTION

SECTION 26 0200

CONDUIT

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all material, labor, tools, and services necessary to install rigid metal conduit, electrical metallic tubing and liquid tight flexible metal conduit, including all fittings to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Cutting and patching.
- B. Trenching: Excavation and backfill for conduit and utility on site.
- C. Sheet metal flashing and trim.

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT

- A. Industry standard heavy wall conduit.
- B. Minimum 3/4" trade size.
- C. Threaded.
- D. Hot dipped galvanized finish by means of plating after cutting of threads.

2.2 INTERMEDIATE METAL CONDUIT

- A. Industry standard steel conduit.
- B. Minimum 3/4" trade size.
- C. Threaded.
- D. Hot dipped galvanized finish by means of plating after cutting of threads.

2.3 ELECTRICAL METALLIC TUBING

- A. Industry standard thin wall conduit of galvanized steel only.
- B. Minimum 3/4" trade size.
- C. Maximum 4" trade size.

2.4 FLEXIBLE METAL CONDUIT

- A. Galvanized steel tape formed into an industry standard interlocking coil.
- B. Minimum 3/4" trade size except for connection of lighting fixtures.
- C. Grounding type.
- D. Separate ground conductor.
- E. Use for short connections to motor terminal box, other vibrating equipment using a minimum length of 18" with 50% slack and a maximum of 6'.
- F. From outlet box to recessed lighting fixtures with a maximum length of 6'.

2.5 WIREWAYS

- A. Lay-in type, UL listed as wireway or auxiliary gutter.
- B. Wireway shall be of code gauge steel construction (UL standard for Wireway Auxiliary Gutters and Associated Fittings) with removable cover. Tamperproof screws shall be provided for sealing covers to prevent access by unauthorized personnel. Wireway shall be provided with knockouts.
- C. Connector and covers shall be attached so that removal of connectors is not necessary to utilize the lay-in feature.
- D. Finish: All sheet metal parts shall be provided with a rust inhibiting phosphating coating and baked enamel finish. All hardware shall be plated to prevent corrosion. All screws extending into the wireway shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

2.6 CONDUIT SUPPORTS

- A. Conduit clamps, straps and supports: Steel or malleable iron.

2.7 CONDUIT FITTINGS

- A. Use compression fittings for all EMT in exposed areas. Utilize set screw fittings only above hung ceilings and concealed areas.

2.8 SURFACE METAL RACEWAY

- A. Metal raceway shall be of a two-piece design with a base and snap-on cover.
- B. Raceway and all components shall be listed by Underwriters Laboratories
- C. Single Channel: Steel, zinc plated, off-white finish suitable for repainting. Two piece design with metal base and snap-on cover. Provide Wiremold V700, Hubbell Inc. 750 Series, or Panduit PMR5/PMR7.
- D. Dual Channel: Steel, galvanized, off-white finish but suitable for repainting. Two-piece design with metal base and snap-on cover, minimum 0.04" thick base and cover. Base shall be divided by a removable barrier section. Provide duplex receptacles mounted in top cell and communication outlets in the bottom cell. Coordinate communications jack requirements with owner's IT personnel. Provide Wiremold V4000, Wiremold DS4000 Series, Hubbell Inc. 4000 Series or Panduit PMR40.

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT AND SUPPORT

- A. Minimum size - 3/4". Provide grounding bushings on all conduits 1-1/4" and larger.
- B. Arrange conduit to maintain headroom and present a neat appearance.
- C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
- D. Draw up couplings and fittings full and tight. Protect threads cut in field from corrosion. Paint newly threaded joints of steel conduit with T & B "Kopershield" compound before installation. Running threads prohibited; use three-piece unions or split couplings instead. Use only compression fittings for all EMT in areas where it will be exposed in finished and unfinished areas. Provide set screw fittings only when installed above hung ceilings.
- E. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues; steam pipes and heating appliances.
- F. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
- G. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.
- H. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction before conductors are pulled.
- I. Exposed conduit on ceiling shall be parallel or perpendicular to wall and vice versa to ceiling when installed on wall. Secure conduit clamps and supports to masonry materials by toggle bolt, expansion bolt or steel insert. Spacing of conduit supports shall not exceed 7 feet.

3.2 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipe cutter, Deburr cut ends.
- B. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes and for fastening conduit to sheet metal boxes in damp or wet locations.
- D. Install no more than the equivalent of three 90-degree bends between boxes.
- E. Use conduit bodies to make sharp changes in direction, as around beams.
- F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch size.
- G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
- I. Provide No. 12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.

- J. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.
- K. Where conduit penetrates fire-rated walls and floors, provide pipe sleeves two sizes larger than conduit; Pack void around conduit with fire-stop fittings with UL listed fire rating equal to wall or floor ratings; Seal opening around conduit with UL listed foamed silicone elastomer compound.
- L. Installation of conduit in slab shall comply with ACI 318.
- M. Route conduit through roof openings for piping and duct work where possible; otherwise, route through roof with pitch pocket.
- N. Maximum size conduit in slabs above grade: 1 inch. Do not route conduits to cross each other in slabs above grade. Conduits crossing each other may not be larger than 3/4 inch.
- O. All conduit used for fire alarm system shall be painted red.

3.3 CONDUIT INSTALLATION OF SCHEDULE

- A. Underground installations: PVC minimum Schedule 40 conduit, unless otherwise noted on Drawings.
- B. Installations in or under concrete slab: PVC minimum Schedule 40 conduit, unless otherwise noted on Drawings.
- C. Exposed outdoor locations: Rigid galvanized steel conduit.
- D. Wet interior locations: Rigid galvanized steel conduit.
- E. Concealed dry interior locations and above accessible ceiling for receptacle and lighting branch wiring: Electrical metallic tubing up to first junction box and flexible metallic tubing (MC cable only) thereafter.
- F. Concealed dry interior locations other than receptacle and lighting branch wiring: Electrical metallic tubing.
- G. Concealed dry interior locations and above accessible ceiling for fire alarm runs: Fire alarm armored cable type MC with red stripe as manufactured by AFC series 1800.
- H. Concealed and exposed dry interior location for feeder runs: Electric metallic tubing.
- I. Exposed dry interior in unfinished locations other than Boiler Rooms: Electric metallic tubing.
- J. Final connections to motors: Flexible metallic tubing (MC cable). Minimum of 10" to maximum of 6' for connections to motors.
- K. Existing exposed dry interior locations (finished spaces), for branch wiring and fire alarm wiring, one-piece steel raceway (similar to Wiremold V-500, V-700).
- L. Final connections to motors: Flexible metallic tubing (MC cable). Minimum of 18" to maximum of 6' for connections to motors.
- M. All conduit installed in boiler room up to 10'-0" AFF and lower shall be rigid galvanized steel conduit. All conduit above 10'-0" shall be electric metallic tubing.
- N. Final connections to equipment and/or motors in boiler room, outdoors and potentially wet indoor areas: liquid tight, flexible; minimum of 18" to maximum 6'-0" connections.

END OF SECTION

SECTION 26 0300

WIRE AND CABLE

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to wire and cable in raceway specified in other sections to complete all work shown on the Drawings or specified herein.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Thermoplastic-insulated building wire: Type THHN.
- B. Rubber insulated building wire: NEMA WC 3.
- C. Feeders and branch circuits larger than number 6 AWG: Copper, stranded conductor, 600 volt insulation, type THHN.
- D. Feeder and branch circuits 6 AWG and smaller: Copper conductor, 600 volt insulation, THWN/THHN, 6 and 8 AWG, stranded conductor; Smaller than 8 AWG, solid conductor.
- E. Service feeders and branch circuits in conduit in contact with earth shall be type XHHW.
- F. Control circuits: Copper, stranded conductor 600 volt insulation, THHN.

2.2 ARMORED CABLE

- A. BX or pre-manufactured cables are not acceptable except for Type MC for branch wiring after the first junction box (for receptacle and lighting branch circuits) and final connections to motors in interior dry accessible locations, minimum length shall be 18" with a maximum length of 6' for motors.
- B. Type MC fire alarm cable with red stripe for concealed fire alarm wiring as manufactured by AFC series 1800.
- C. Armored cable, Type MC size 14 through 6 AWG: Copper conductor, 600 volt thermoplastic insulation, rated 90 degrees C., with separate green ground conductor.

2.3 REMOTE CONTROL AND SIGNAL CABLE

- A. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together shielded and covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts and plenums. Verify wiring type with manufacturer.

2.4 COLOR CODING

- A. All wiring shall be color-coded. Neutral wire shall be white throughout and each phase wire shall be identified any place in the system by its color code. All conductors in panel boxes and junction boxes shall be properly tagged with red non-flammable tags properly attached.
- B. Wire shall be color coded as follows:
- | | <u>120/208 volt system</u> | <u>Fire Alarm</u> |
|---------|----------------------------|-------------------|
| A Phase | Black | Red |
| B Phase | Red | |
| C Phase | Blue | |
- C. Equipment ground wires or ground jumpers shall be Green.
- D. In addition to the basic color-coding described the following additional identification and tagging shall apply.
1. The switch legs for the local wall switches and in switch panel shall have distinctive stripes. In instances where color-coding is not practicable, such as short runs of heavy feeder cables, taping the ends of the cable with coded colors as indicated above or tagging will be permitted.
 2. Cables shall be tagged in all pull boxes, wireways and wiring gutters of panels.
 3. Where two (2) or more circuits run to or through a control device, outlet box or junction box, each circuit shall be tagged as a guide in making connections.
 4. Tags shall identify wire or cable by number and/or piece of equipment served as shown on the Drawings.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
- B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet and for 20 ampere.
- C. Use 10 AWG conductor for 20 ampere, 277 volt branch circuit home runs longer than 200 feet for 20 ampere.
- D. Place an equal number of conductors for each phase of a circuit in same raceway or cable. No more than one of each phase shall be supported by a single neutral.
- E. Splice only in junction or outlet boxes.
- F. Neatly tag, identify, train and lace wiring inside boxes, equipment and panelboards.
- G. Make conductor lengths for parallel circuits equal.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricate for pulling 4 AWG and larger wires.
- B. Completely and thoroughly swab raceway system before installing conductors.
- C. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

3.3 CABLE INSTALLATION

- A. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or metal cable ties to support cables from structure (not ceiling suspension system). Include bridle rings or drive rings.
- B. Use suitable cable fitting and connectors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. Use solderless pressure connections with insulating covers for copper wire splices and tape, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps.
- C. Provide extended gutters and tap blocks or pull boxes with tap rail systems similar to Burndy MT Series or Burndy Electroraill system for wire splices 6 AWG and larger.
- D. Tape uninsulated conductors with electrical tape to 150 percent of the insulation value of conductor.
- E. Thoroughly clean wires before installing lugs and connectors.
- F. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- G. Terminate spare conductors with electrical tape.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of the Specifications.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque test conductor connections and terminations to manufacturer's recommended values.
- D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

3.6 WIRE AND CABLE INSTALLATION SCHEDULE

- A. All wiring and cable shall be installed in conduit unless otherwise noted. Refer to conduit section 26 0200 for conduit types at various location.

END OF SECTION

SECTION 26 0320

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. Work of this section includes all labor, materials, equipment and services necessary to complete the electrical work as shown of the Drawings and specified herein, including, but not limited to, the following:
- B. Fuses
 - 1. Current limiting cartridge fuses.
 - 2. Time delay cartridge fuses.
- C. Circuit Breakers
 - 1. Standard molded case circuit breakers "bolted in" type.
 - 2. Solid state circuit breakers.
 - 3. Current limiting circuit breakers.
 - 4. Enclosed circuit breakers.

1.2 SUBMITTALS

- A. Shop drawings showing dimensions, location of equipment and method of installation.
- B. Product Data: Manufacturer's printed data, catalog cuts.

1.3 DISCONNECT SWITCHES

- A. Fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover when switch is in ON position. Handle lockable in OFF position. Fuse clips shall be designed to accommodate Class R, J fuses.
- B. Non-fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover when switch is in ON position. Handle lockable in OFF position.
- C. Enclosures: NEMA Type 1, 3R or 4 as required.

1.4 FUSES

- A. Voltage ratings of fuses shall be suitable for the supply characteristics to which they are applied.
- B. Fuse type and size shall be suitable for installation in related disconnect switch or circuit breaker.

C. Current limiting fuses shall be as follows:

1. Regardless of actual available fault current, they shall, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical or 280,000 amperes RMS asymmetrical, deliverable at the line side of the fuse.
2. They shall have average melting time-current characteristics to meet the Underwriters' Laboratories requirements for "Class RK-1" 0-600 amp fuses.

D. Regardless of actual available fault current, they shall be capable of limiting peak let through current to the following values based on 200,000 amperes RMS symmetrical or 280,000 amperes asymmetrical being available:

<u>Rating In Amperes</u>	<u>Peak Let Through Current In Amps</u>
15-30	6,000
35-50	8,000
70-100	12,000
125-200	20,000
225-601	38,000

E. Fuses shall be rejection type. Fuse clip shall be rejection type.

F. Fuse Type and Application Table:

<u>Category of Application</u>	<u>Acceptable Fuse Types</u> (Bussman Designations @ 600V)
Motor feeder	LPS below 600A
Power panel feeders	LPS below 600A
Safety switches	LPS

1.5 CIRCUIT BREAKERS

- A. "Bolted-In" type, manually operated, quick-make, quick-break, mechanically trip-free operating mechanisms for simultaneous operation, of all poles, with contacts, arc interrupters and trip elements for each pole. "Plug-in" breakers are not permitted.
- B. Tripping units shall be "thermal-magnetic" type having bimetallic elements for time delay overload protection, and magnetic elements for short circuit protection.
- C. Manually operable by mean of toggle type operating handles having tripped positions midway between the "on-off" position. Handle to be clearly labeled as to breaker rating.
- D. Minimum frame size for all circuit breakers, 1, 2, or 3 pole shall be 100 amperes.
- E. Their interrupting rating shall not be less than 25,000 amperes RMS symmetrical at 208 volt for distribution panels and 10,000 amperes for power panels.

1.6 APPLICATIONS

- A. Category of Application for Fuses
 - 1. Feeders on switchboards.
 - 2. Branch fused switch unit in distribution panel.
 - 3. Fused safety switch.
 - 4. Combination motor starters.
- B. Category of Application for Circuit Breakers
 - 1. Panelboards.
 - 2. Switchboards.
 - 3. Individual enclosures.
 - 4. Combination motor starters.

1.7 SPARE FUSES

- A. Upon Engineer's acceptance of the electrical distribution system, provide spare fuses as follows: 10% of each type and rating installed 600 amperes and smaller (minimum of 3). Provide spare fuse cabinet with directory to store all spare fuses. Locate as directed by Engineer and/or Owner.

1.8 APPROVED MANUFACTURERS

- A. Fuses: Bussman, Ferraz-Shawmut.
- B. Circuit Breakers: Siemens, General Electric, Square D.

1.9 INSTALLATION

- A. All material installation shall be in accordance with manufacturer recommendations and the provisions of all applicable codes.
- B. All fuses and circuit breakers shall be selectively coordinated.
- C. Install disconnect switches where indicated on Drawings.
- D. Install fuses in fusible disconnect switches.
- E. Disconnects shall have NEMA 3R enclosure.

1.10 RECORD DRAWINGS

- A. Shop drawings showing dimensions, location of equipment and method of installation.
- B. Product Data: Manufacturer's printed data, catalog cuts, performance curves.

END OF SECTION

SECTION 26 0350

BOXES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install wall and ceiling outlet boxes, floor boxes, pull and junction boxes to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Access doors.
- B. Wiring devices: Service fittings and fire-rated poke-through fittings for floor boxes.
- C. Cabinets and enclosures.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

- A. Sheet metal outlet boxes: ANSI/NEMA OS 1; Galvanized steel, with 1/2 inch male fixture studs where required.
- B. Cast boxes: Cast ferroalloy, deep type, gasketed cover, threaded hubs.
- C. Typical receptacle box shall be 4" square metal boxes, 30.8 cubic inch capacity with brackets as required. Provide 4" square raised device covers.

2.2 PULL AND JUNCTION BOXES

- A. Sheetmetal boxes: ANSI/NEMA OS 1; Galvanized steel.
- B. Sheetmetal boxes larger than 12 inches in any dimension: Hinged enclosure in accordance with Section 26 0450.
- C. Cast metal boxes for outdoor and wet location installations: NEMA 250; Type 4 and type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.
- D. Cast metal boxes for underground installation: NEMA 250; Type 4, inside flanged, recessed cover box for flush mounting, UL listed as raintight. Galvanized cast iron box and plain cover with neoprene gasket and stainless cover screws.

PART 3 - EXECUTION

3.1 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as required in excess of that shown on Drawings and as required for splices, taps, wire pulling, equipment connections and code compliance.

- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.
- C. Locate and install boxes to allow access. Where installations are accessible, coordinate locations and sizes of required access doors with Division 1.
- D. Locate and install to maintain headroom and to present neat appearance.

3.2 OUTLET BOX INSTALLATION

- A. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24 inch separation in acoustic-rated walls.
- B. Locate boxes in masonry walls to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat openings for boxes.
- C. Provide knockout closures for unused openings.
- D. Support boxes independently of conduit except for cast iron boxes that are connected of rigid metal conduits, both supported within 12 inches of box.
- E. Use multiple-gang boxes where more than one device is mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- F. Install boxes in wall without damaging wall insulation.
- G. Coordinate mounting heights and locations of outlets mounted above counters, benches and backspaces.
- H. Position outlets to locate luminaries as shown on reflected ceiling plans.
- I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.
- J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
- K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- L. Provide cast outlet boxes in exterior locations exposed to the weather and wet locations.

3.3 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

3.4 FLOOR BOX INSTALLATION

- A. Set boxes level and flush with finish flooring material.
- B. Use cast iron floor boxes for installation in slab on grade.

END OF SECTION

SECTION 26 0400

WIRING DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install receptacles, service fittings device plates and box covers to complete all work shown on the Drawings or specified herein.

1.2 REFERENCES

- A. FS W-C-596 - Electrical power connector, plug, receptacles and cable outlet.
- B. FS W-S-896 - Switch, toggle.
- C. NEMA WD 1 - General purpose wiring devices.
- D. NEMA WD 5 - Specific-purpose wiring devices.

1.3 SUBMITTALS

- A. Submit product data under Provisions of Contract and Division 1.
- B. Provide product data showing configurations, finishes, dimensions and manufacturer's instructions.

PART 2 - PRODUCTS

2.1 RECEPTACLES

- A. Convenience and straight-blade receptacles: 125 V, 2 pole, 3 wire, 20 ampere specification grade, ground fault interrupting or isolated ground type.
- B. Internal ground clip of receptacles shall be in one piece with the receptacle mounts.
- C. Receptacles with riveted ground clips will not be accepted.
- D. Isolated ground type receptacle shall be orange in color.

2.2 WALL SWITCHES

- A. Wall switches for lighting circuits and motor loads under 1/2 hp: AC general use snap switch with toggle handle, rated 20 amperes and 120-277 volts AC.
- B. Handle: Ivory plastic.
- C. Pilot light type: Lighted handle. Pilot strap in adjacent gang.
- D. Locator type: Lighted handle.

2.3 COVER PLATES

- A. Decorative cover plate: Stainless steel 302/304 smooth Hubbell "S" series.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install receptacles on roof along parapet wall.
- B. Install specific use receptacles at heights shown on contract drawings.
- C. Drill opening for poke - through fitting installation in accordance with manufacturer's instructions.
- D. Install plates on switch, receptacle, and blank outlets in finished areas, using jumbo size plates for outlets installed in masonry walls.
- E. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings and on surface mounted outlets.
- F. Install devices and wall plates flush and level.

END OF SECTION

SECTION 26 0425

DIGITAL LIGHTING CONTROL SYSTEM

PART 1 – GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 SUMMARY

- A. Section Includes
 - 1. Digital Lighting Controls
 - 2. Relay Panels
 - 3. Emergency Lighting Control (if applicable)
- B. Related Sections
 - 1. Section 26 0400 Wiring Devices: Receptacles
 - 2. Section 26 0575 Interior Luminaires.
 - 3. Electrical Sections, including wiring devices, apply to the work of this Section.
- C. Control Intent – Control Intent includes, but is not limited to:
 - 1. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
 - 2. Initial sensor and switching zones
 - 3. Initial time switch settings
 - 4. Task lighting and receptacle controls
 - 5. Emergency Lighting control (if applicable)

1.2 REFERENCES

- A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)
- B. Underwriter Laboratories of Canada (ULC)
- C. International Electrotechnical Commission (IEC)
- D. International Organization for Standardization (ISO)
- E. National Electrical Manufacturers Association (NEMA)
- F. WD1 (R2005) - General Color Requirements for Wiring Devices.
- G. Underwriters Laboratories, Inc. (UL)
 - 1. 20 – Plug Load Controls
 - 2. 508– Industrial Controls
 - 3. 916 – Energy Management Equipment.
 - 4. 924 – Emergency Lighting

1.3 SYSTEM DESCRIPTION AND OPERATION

- A. The Lighting Control and Automation system as defined under this section covers the following equipment:
1. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
 2. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active infrared (IR) communications.
 3. Handheld remotes for personal control – One-button dimming, two-button on/off, or five-button scene remotes provide control using infrared communications. Remote may be configured in the field to control selected loads or scenes without special tools.
 4. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.
 5. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0-10 volt or line voltage forward phase control dimming outputs and integral current monitoring capabilities.
 6. Digital Plug-Load Controllers – Self-configuring, digitally addressable, single relay, plenum-rated application-specific controllers. Selected models include integral current monitoring capabilities.
 7. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings.
 8. Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.
 9. Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control
 10. Network Bridge – provides BACnet MS/TP-compliant digital networked communication between rooms, panels and the Segment Manager or building automation system (BAS) and automatically creates BACnet objects representative of connected devices.
 11. Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting.
 12. Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.
 13. LMCP Digital Lighting Management Relay Panel – provides up to 8, 24, or 48 mechanically latching relays. Relays include a manual override and a single push-on connector for easy installation or removal from the panel. Panel accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).
 14. LMZC-301 – Digital Zone Controller. Accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).
 15. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building.

1.4 LIGHTING CONTROL APPLICATIONS

- A. Unless relevant provisions of the applicable local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:
1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces except toilet rooms, storerooms, library stacks, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room, open plan system and training room. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and Manual-ON switches.
 2. Bi-Level Lighting – Provide multi-level controls in all spaces except toilet rooms, storerooms, library stacks, or applications where variable dimming is used.
 3. Task Lighting / Plug Loads – Provide automatic shut off of non-essential plug loads and task lighting in all spaces except toilet rooms and storerooms. Provide Automatic-ON of plug loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with the overhead lighting may be used for the area.
 4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant local building energy code:
 - a. All luminaires within code-defined daylight zones shall be controlled separately from luminaires outside of daylit zones.
 - b. Daytime setpoints for total ambient illumination (combined daylight and electric light) levels that initiate dimming shall be programmed in compliance with relevant local building energy codes.
 - c. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.
 - d. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to turn off electric lighting when daylight is at or above required lighting levels, only if system functions to turn lamps back on at dimmed level, rather than turning full-on prior to dimming.
 5. Conference, meeting, training, auditoriums, and multipurpose rooms shall have controls that allow for independent control of each local control zone. Rooms larger than 300 square feet shall instead have at least four (4) pre-set lighting scenes unless otherwise specified. Occupancy / vacancy sensors shall be provided to extinguish all lighting in the space. Spaces with up to four moveable walls shall include controls that can be reconfigured when the room is partitioned.

1.5 SUBMITTALS

- A. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.
- B. Shop Drawings
1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
 2. Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans.)
 3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
 4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.
- C. Product Data: Catalog sheets, specifications and installation instructions.

D. Include data for each device which:

1. Indicates where sensor is proposed to be installed.
2. Prove that the sensor is suitable for the proposed application.

1.6 QUALITY ASSURANCE

A. Manufacturer: Minimum [10] years' experience in manufacture of lighting controls.

1.7 PROJECT CONDITIONS

A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:

1. Ambient temperature: 0° to 40° C (32° to 104° F).
2. Relative humidity: Maximum 90 percent, non-condensing.

1.8 WARRANTY

A. Provide a five year limited manufacturer's warranty on all room control devices and panels.

1.9 MAINTENANCE

A. Spare Parts

1. Provide spares of each product to be used for maintenance as listed below: Refer to design documents. Coordinate with owner for quantity prior to purchase order.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer

1. WattStopper
 - a. System: Digital Lighting Management (DLM)
2. Basis of design product: WattStopper Digital Lighting Management (DLM) or subject to compliance and prior approval with specified requirements of this section, one of the following:
 - a. Refer to design documents.

B. Substitutions: [If Permitted]

1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
2. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design highlighted for review and approval prior to rough-in.

2.2 DIGITAL LIGHTING CONTROLS

- A. Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.3 DIGITAL WALL SWITCH OCCUPANCY SENSORS

- A. Wallbox mounted passive infrared PIR or dual technology (passive infrared and ultrasonic) digital occupancy sensor with 1 or 2 switch buttons.
- B. Digital Occupancy Sensors shall provide scrolling LCD display for digital calibration and electronic documentation. Features include the following:
 - 1. Digital calibration and pushbutton configuration for the following variables:
 - a. Sensitivity – 0-100% in 10% increments
 - b. Time delay – 1-30 minutes in 1 minute increments
 - c. Test mode – Five second time delay
 - d. Detection technology – PIR, Dual Technology activation and/or re-activation.
 - e. Walk-through mode
 - f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.
 - 2. Programmable control functionality including:
 - a. Each sensor may be programmed to control specific loads within a local network.
 - b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
 - c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically during the configurable period of time (default 10 seconds) after turning off.
 - d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
 - i Ultrasonic and Passive Infrared
 - ii Ultrasonic or Passive Infrared
 - iii Ultrasonic only
 - iv Passive Infrared only
 - 3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
 - 4. Two RJ-45 ports for connection to DLM local network.
 - 5. Two-way infrared (IR) transceiver to allow remote programming through handheld configuration tool and control by remote personal controls.
 - 6. Device Status LEDs including:
 - a. PIR detection
 - b. Ultrasonic detection
 - c. Configuration mode
 - d. Load binding
 - 7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
 - 8. Assignment of local buttons to specific loads within the room without wiring or special tools.

9. Manual override of controlled loads.
 10. All digital parameter data programmed into an individual wall switch sensor shall be retained in non-volatile FLASH memory within the wall switch sensor itself. Memory shall have an expected life of no less than 10 years.
- C. BACnet object information shall be available for the following objects:
1. Detection state
 2. Occupancy sensor time delay
 3. Occupancy sensor sensitivity, PIR and Ultrasonic
 4. Button state
 5. Switch lock control
 6. Switch lock status
- D. Units shall not have any dip switches or potentiometers for field settings.
- E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.
- F. Two-button wall switch occupancy sensors, when connected to a single relay dimming room controller, shall operate in the following sequence as a factory default:
1. Left button
 - a. Press and release - Turn load on
 - b. Press and hold - Raise dimming load
 2. Right button
 - a. Press and release - Turn load off
 - b. Press and hold - Lower dimming load
- G. Low voltage momentary pushbuttons shall include the following features:
1. Load/Scene Status LED on each switch button with the following characteristics:
 - a. Bi-level LED
 - b. Dim locator level indicates power to switch
 - c. Bright status level indicates that load or scene is active
 2. The following button attributes may be changed or selected using a wireless configuration tool:
 - a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
 - b. Individual button function may be configured to Toggle, On only or Off only.
 - c. Individual scenes may be locked to prevent unauthorized change.
 - d. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
 - e. Ramp rate may be adjusted for each dimmer switch.
 - f. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
- H. WattStopper part numbers: LMPW, LMDW. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.4 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

- A. Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor.
- B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:
 - 1. Digital calibration and pushbutton configuration for the following variables:
 - a. Sensitivity – 0-100% in 10% increments
 - b. Time delay – 1-30 minutes in 1 minute increments
 - c. Test mode – Five second time delay
 - d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - e. Walk-through mode
 - f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.
 - 2. Programmable control functionality including:
 - a. Each sensor may be programmed to control specific loads within a local network.
 - b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
 - c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically within a configurable period of time (default 10 seconds) after turning off.
 - d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
 - i Ultrasonic and Passive Infrared
 - ii Ultrasonic or Passive Infrared
 - iii Ultrasonic only
 - iv Passive Infrared only
 - 3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
 - 4. One or two RJ-45 port(s) for connection to DLM local network.
 - 5. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
 - 6. Device Status LEDs, which may be disabled for selected applications, including:
 - a. PIR detection
 - b. Ultrasonic detection
 - c. Configuration mode
 - d. Load binding
 - 7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
 - 8. Manual override of controlled loads.
 - 9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.

- C. BACnet object information shall be available for the following objects:
 - 1. Detection state
 - 2. Occupancy sensor time delay
 - 3. Occupancy sensor sensitivity, PIR and Ultrasonic
- D. Units shall not have any dip switches or potentiometers for field settings.
- E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.
- F. WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.5 DIGITAL WALL SWITCHES

- A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration. Wall switches shall include the following features:
 - 1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
 - 2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
 - 3. Configuration LED on each switch that blinks to indicate data transmission.
 - 4. Load/Scene Status LED on each switch button with the following characteristics:
 - a. Bi-level LED
 - b. Dim locator level indicates power to switch
 - c. Bright status level indicates that load or scene is active
 - 5. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.
 - 6. Programmable control functionality including:
 - a. Button priority may be configured to any BACnet priority level, from 1-16, corresponding to networked operation allowing local actions to utilize life safety priority
 - b. Scene patterns may be saved to any button other than dimming rockers. Once set, buttons may be digitally locked to prevent overwriting of the preset levels.
 - 7. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.
- B. BACnet object information shall be available for the following objects:
 - 1. Button state
 - 2. Switch lock control
 - 3. Switch lock status
- C. Two RJ-45 ports for connection to DLM local network.
- D. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.

- E. The following switch attributes may be changed or selected using a wireless configuration tool:
1. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
 2. Individual button function may be configured to Toggle, On only or Off only.
 3. Individual scenes may be locked to prevent unauthorized change.
 4. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
 5. Ramp rate may be adjusted for each dimmer switch.
 6. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
- F. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.6 HANDHELD REMOTE CONTROLS

- A. Battery-operated handheld devices in 1, 2 and 5 button configurations for remote switching or dimming control. Remote controls shall include the following features:
1. Two-way infrared (IR) transceiver for line of sight communication with DLM local network within up to 30 feet.
 2. LED on each button confirms button press.
 3. Load buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
 4. Inactivity timeout to save battery life.
- B. A wall mount holster and mounting hardware shall be included with each remote control.
- C. WattStopper part numbers: LMRH-101, LMRH-102, LMRH-105.

2.7 DIGITAL PARTITION CONTROLS

- A. Partition controls shall enable manual or automatic coordination of lighting controls in flexible spaces with up to four moveable walls by reconfiguring the connected digital switches and occupancy sensors.
- B. Four-button low voltage pushbutton switch for manual control.
1. Two-way infrared (IR) transceiver for use with configuration remote control.
 2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
 3. Configuration LED on each switch that blinks to indicate data transmission.
 4. Each button represents one wall; Green button LED indicates status.
 5. Two RJ-45 ports for connection to DLM local network.
 6. WattStopper part number: LMPS-104. Available in white, light almond, ivory, grey and black; compatible with wall plates with decorator opening.
- C. Contact closure interface for automatic control via input from limit switches on movable walls (by others).
1. Operates on Class 2 power supplied by DLM local network.
 2. Includes 24VDC output and four input terminals for maintained third party contract closure inputs.
 - a. Input max. sink/source current: 1-5mA
 - b. Logic input signal voltage High: >18VDC
 - c. Logic input signal voltage Low: <2VDC

3. Four status LEDs under hinged cover indicate if walls are open or closed; supports LMPS-104 as remote status indicator.
4. Two RJ-45 ports for connection to DLM local network.
5. WattStopper part number: LMIO-102

2.8 DIGITAL DAYLIGHTING SENSORS

- A. Digital daylighting sensors shall work with room controllers to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to a room controller. Daylighting sensors shall be interchangeable without the need for rewiring.
1. Closed loop sensors measure the ambient light in the space and control a single lighting zone.
 2. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.
 3. Dual loop sensors measure both ambient and incoming daylight in the space to insure that proper light levels are maintained as changes to reflective materials are made in a single zone.
- B. Digital daylighting sensors shall include the following features:
1. The sensor's internal photodiode shall only measure lightwaves within the visible spectrum. The photodiode's spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
 2. Sensor light level range shall be from 1-6,553 foot candles (fc).
 3. The capability of ON/OFF, bi-level or tri-level switching, or dimming, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).
 4. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.
 5. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.
 6. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.
 7. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.
 8. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
 9. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
 10. Configuration LED status light on device that blinks to indicate data transmission.
 11. Status LED indicates test mode, override mode and load binding.
 12. Recessed switch on device to turn controlled load(s) ON and OFF.
 13. BACnet object information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:
 - a. Light level
 - b. Day and night setpoints
 - c. Off time delay
 - d. On and off setpoints
 - e. Up to three zone setpoints
 - f. Operating mode – on/off, bi-level, tri-level or dimming

14. One RJ-45 port for connection to DLM local network.
 15. A choice of accessories to accommodate multiple mounting methods and building materials. The photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photosensors accommodate mounting materials from 0-0.62" thickness (LMLS-400, LMLS-500). Extended tube photosensors accommodate mounting materials from 0.62"-1.25" thickness (LMLS-400-L, LMLS-500-L). Mounting brackets are compatible with J boxes (LMLS-MB1) and wall mounting (LMLS-MB2). LMLS-600 photosensor to be mounted on included bracket below skylight well.
 16. Any load or group of loads in the room can be assigned to a daylighting zone
 17. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).
 18. All digital parameter data programmed into a photosensor shall be retained in non-volatile FLASH memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.
- C. Closed loop digital photosensors shall include the following additional features:
1. An internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from bright sources outside of this cone.
 2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.
 3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of loads.
 4. WattStopper Product Number: LMLS-400, LMLS-400-L.
- D. Open loop digital photosensors shall include the following additional features:
1. An internal photodiode that measures light in a 60-degree angle cutting off the unwanted light from the interior of the room.
 2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling; for dimming operation, a proportional control algorithm shall maintain the design lighting level in each zone.
 3. Each of the three discrete daylight zones can include any non-overlapping group of loads in the room.
 4. WattStopper Product Number: LMLS-500, LMLS-500-L.
- E. Dual loop digital photosensors shall include the following additional features:
1. Close loop portion of dual loop device must have an internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from sources outside of this cone
 2. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60 degree angle, cutting off the unwanted light from the interior of the room.
 3. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.
 4. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.
 5. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.
 6. Device must include extendable mounting arm to properly position sensor within a skylight well.
 7. WattStopper product number LMLS-600

2.9 DIGITAL ROOM CONTROLLERS AND PLUG-LOAD CONTROLLERS

- A. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, and will not have dip switches or potentiometers, or require special configuration for standard Plug n' Go applications. The control units will include the following features:
1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
 2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.
 3. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device ID's from highest to lowest.
 4. Device Status LEDs to indicate:
 - a. Data transmission
 - b. Device has power
 - c. Status for each load
 - d. Configuration status
 5. Quick installation features including:
 - a. Standard junction box mounting
 - b. Quick low voltage connections using standard RJ-45 patch cable
 6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
 - a. Turn on to 100%
 - b. Remain off
 - c. Turn on to last level
 7. Each load shall be configurable to operate in the following sequences based on occupancy:
 - a. Auto-on/Auto-off (Follow on and off)
 - b. Manual-on/Auto-off (Follow off only)
 8. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.
 9. BACnet object information shall be available for the following objects:
 - a. Load status
 - b. Electrical current
 - c. Total watts per controller
 - d. Schedule state – normal or after-hours
 - e. Demand response control and cap level
 - f. Room occupancy status
 - g. Total room lighting and plug loads watts
 - h. Total room watts/sq ft
 - i. Force on/off all loads
 10. UL 2043 plenum rated.
 11. Manual override and LED indication for each load.

12. Dual voltage (120/277 VAC, 60 Hz), or 347 VAC, 60 Hz (selected models only). 120/277 volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347 volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.
 13. Zero cross circuitry for each load
 14. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.
- B. On/Off Room Controllers shall include:
1. One or two relay configuration
 2. Efficient 150 mA switching power supply
 3. Three RJ-45 DLM local network ports with integral strain relief and dust cover
 4. Watt Stopper product numbers: LMRC-101, LMRC-102
- C. On/Off/Dimming enhanced Room Controllers shall include:
1. Real time current monitoring
 2. Multiple relay configurations
 - a. One, two or three relays (LMRC-21x series)
 - b. One or two relays (LMRC-22x series)
 3. Efficient 250 mA switching power supply
 4. Four RJ-45 DLM local network ports with integral strain relief and dust cover
 5. One dimming output per relay
 - a. 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series)
 - b. Line Voltage, Forward Phase Dimming - Where indicated, one forward phase control line voltage dimming output per relay for control of compatible two-wire or three-wire ballasts, LED drivers, MLV, forward phase compatible ELV, neon/cold cathode and incandescent loads. (LMRC-22x series)
 - c. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.
 - d. The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.
 - e. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
 - f. Calibration and trim levels must be set per output channel.
 - g. Devices that set calibration or trim levels per controller are not acceptable.
 - h. All configuration shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.

6. Each load shall have an independently configurable preset on level for Normal Hours and After Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After Hours events.
7. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.
8. The following dimming attributes may be changed or selected using a wireless configuration tool:
 - a. Establish preset level for each load from 0-100%
 - b. Set high and low trim for each load
 - c. Set lamp burn in time for each load up to 100 hours
9. Override button for each load provides the following functions:
 - a. Press and release for on/off control
 - b. Press and hold for dimming control
10. WattStopper product numbers: LMRC-211, LMRC-212, LMRC-213, LMRC-221, LMRC-222

D. Plug Load Room Controllers shall include:

1. One relay configuration with additional connection for un-switched load
2. Configurable additive time delay to extend plug load time delay beyond occupancy sensor time delay (e.g. a 10 minute additive delay in a space with a 20 minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).
3. Factory default operation is Auto-on/Auto-off, based on occupancy
4. Real time current monitoring of both switched and un-switched load (LMPL-201 only)
5. Efficient switching power supply
 - a. 150mA (LMPL-101)
 - b. 250mA (LMPL-201)
6. RJ-45 DLM local network ports
 - a. Three RJ-45 ports (LMPL-101)
 - b. Four RJ-45 ports (LMPL-201)
7. WattStopper product numbers: LMPL-101, LMPL-201.

2.10 DLM LOCAL NETWORK (Room Network)

- A. The DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.
- B. Features of the DLM local network include:
 1. Plug n' Go® automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
 2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.
 3. Push n' Learn® configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
 4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.
- C. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.

- D. If manufacturer's pre-terminated Cat 5e cables are not used for the installation, the contractor is responsible for testing each cable following installation and supplying manufacturer with test results.
- E. WattStopper Product Number: LMRJ-Series

2.11 DLM SEGMENT NETWORK (Room to Room Network)

- A. The segment network shall be a linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.
 - 1. Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.
 - 2. Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate "in" and "out" terminations, for segment network connections.
 - 3. The segment network shall utilize 1.5 twisted pair, shielded, cable supplied by the lighting control manufacturer. The maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30 pf/ft and have a characteristic impedance of 120 Ohms.
 - 4. Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.
 - 5. Substitution of manufacturer-supplied cable must be pre-approved: Manufacturer will not certify network reliability, and reserves the right to void warranty, if non-approved cable is installed, and if terminations are not completed according to manufacturer's specific requirements.
 - 6. Segment networks shall be capable of connecting to BACnet-compliant BAS (provided by others) either directly, via MS/TP, or through NB-ROUTERS, via BACnet/IP or BACnet/Ethernet. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.
- B. WattStopper Product Number: LM-MSTP, LM-MSTP-DB

2.12 CONFIGURATION TOOLS

- A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.
- B. Features and functionality of the wireless configuration tool shall include but not be limited to:
 - 1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
 - 2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.
 - 3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.
 - 4. Save up to eight occupancy sensor setting profiles and apply profiles to selected sensors.
 - 5. Temporarily adjust light level of any load(s) on the local network and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
 - 6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.

7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
8. Verify status of building level network devices.

C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

2.13 NETWORK BRIDGE

A. The network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.

1. The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.
2. Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.
3. The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:
 - a. Read/write the normal or after hours schedule state for the room
 - b. Read the detection state of each occupancy sensor
 - c. Read the aggregate occupancy state of the room
 - d. Read/write the On/Off state of loads
 - e. Read/write the dimmed light level of loads
 - f. Read the button states of switches
 - g. Read total current in amps, and total power in watts through the room controller
 - h. Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings
 - i. Activate a preset scene for the room
 - j. Read/write daylight sensor fade time and day and night setpoints
 - k. Read the current light level, in foot candles, from interior and exterior photosensors and photocells
 - l. Set daylight sensor operating mode
 - m. Read/write wall switch lock status
 - n. Read watts per square foot for the entire controlled room
 - o. Write maximum light level per load for demand response mode
 - p. Read/write activation of demand response mode for the room
 - q. Activate/restore demand response mode for the room

B. WattStopper product numbers: LMBC-300

2.14 SEGMENT MANAGER

- A. For networked applications, the Digital Lighting Management system shall include at least one segment manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256 bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443).
- B. Each segment manager shall have integral support for at least three segment networks. Segment networks may alternately be connected to the segment manger via external routers and switches, using standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the plans.
- C. Operational features of the Segment Manager shall include the following:
 - 1. Connection to PC or LAN via standard Ethernet TCP/IP via standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic.
 - 2. Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. Shall not require installation of any lighting control software to an end-user PC.
 - 3. Log in security capable of restricting some users to view-only or other limited operations.
 - 4. Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels.
 - 5. After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the user.
 - 6. Ability to view and modify room device operational parameters. It shall be possible to set device parameters independently for normal hours and after hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On.
 - 7. Ability to set up schedules for rooms and panels, view and override current status of panel channels and relays, and assign relays to groups. Schedules shall automatically set controlled zones or areas to either a normal hours or after hours mode of operation. Support for a minimum of 100 unique schedules, each with up to four time events per day. Support for annual schedules, holiday schedules and unique date-bound schedules.
 - 8. Ability to group rooms and loads for common control by schedules, switches or network commands.
 - 9. Ability to monitor connected load current and display power consumption for areas equipped with room controllers incorporating the integral current monitoring feature.
 - 10. Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control.
 - 11. The Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable.
- D. Segment Manager shall support multiple DLM rooms as follows:
 - 1. Support up to 120 network bridges and 900 digital in-room devices (LMSM-3E).
 - 2. Support up to 300 network bridges and 2,200 digital in room devices, connected via network routers and switches (LMSM-6E).
- E. WattStopper Product Numbers: LMSM-3E, LMSM-6E, NB-ROUTER, NB-SWITCH, NB-SWITCH-8, NB-SWITCH-16.

2.15 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

- A. PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.
1. Additional parameters exposed through this method include but are not limited to:
 - a. Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.
 - b. Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.
 - c. Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.
 - d. Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.
 - e. Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.
 - f. Load control polarity reversal so that on events turn loads off and vice versa.
 - g. Per-load DR (demand response) shed level in units of percent.
 - h. Load output pulse mode in increments of 1second.
 - i. Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered On of switched loads in response to a dimmer.
 2. Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:
 - a. Device list report: All devices in a project listed by type.
 - b. Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.
 - c. BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.
 - d. Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.
 - e. Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.
 - f. Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100%, 2 = all loads 75%, 3 = all loads 50%, 4 = all loads 25%, 5-16 = same as scene 1).
 - g. Occupancy sensor report: Basic settings including time delay and sensitivity(ies) for all occupancy sensors.
 3. Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:
 - a. Set, copy/paste an entire project site of sensor time delays.
 - b. Set, copy/paste an entire project site of sensor sensitivity settings.
 - c. Search based on room name and text labels.
 - d. Filter by product type (i.e. LMRC-212) to allow parameter set by product.
 - e. Filter by parameter value to search for product with specific configurations.
 4. Network-wide firmware upgrading remotely via the BACnet/IP network.
 - a. Mass firmware update of entire rooms.
 - b. Mass firmware update of specifically selected rooms or areas.
 - c. Mass firmware upgrade of specific products.
- B. WattStopper Product Number: LMCS-100, LMCI-100

PART 1 – EXECUTION

1.1 PRE-INSTALLATION MEETING

- A. A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:
 - 1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.
 - 2. Review the specifications for low voltage control wiring and termination.
 - 3. Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.
 - 4. Discuss requirements for integration with other trades.

1.2 CONTRACTOR INSTALLATION AND SERVICES

- A. Contractor to install all devices and wiring in a professional manner. All line voltage connections to be tagged to indicate circuit and switched legs.
- B. Contractor to install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation, and shall supply the lighting controls manufacturers with test results. Contractor to install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.
- C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start-up, contractor shall test all devices to ensure proper communication.
- D. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings. Adjust time delay so that controlled area remains lighted while occupied.
- E. Provide written or computer-generated documentation on the configuration of the system including room by room description including:
 - 1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
 - 2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
 - 3. Load Parameters (e.g. blink warning, etc.)
- F. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity.

3.3 FACTORY SERVICES

- A. Upon completion of the installation, the manufacturer's factory authorized representative shall start up and verify a complete fully functional system.
- B. The Electrical Contractor shall provide both the manufacturer and the electrical engineer with three weeks written notice of the system start up and adjustment date.
- C. Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

3.4 COMMISSIONING SERVICES

- A. On this project, a commissioning agent will be hired to verify the installation and programming of all building systems, which includes the lighting control system. Manufacturer should include an extra day of technician's time to review the functionality and settings of the lighting control hardware with the commissioning agent, including reviewing submittal drawings and ensuring that instructions on how to configure each device are readily available. Manufacturer is NOT responsible for helping the commissioning agent inspect the individual devices. It will be the commissioning agent's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the agent with this task.
- B. The commissioning agent shall work with the Electrical Contractor during installation of the lighting control hardware to become familiar with the specific products. The agent may also accompany the manufacturer's technicians during their start-up work to better understand the process of testing, calibration and configuration of the products. However, the contractor and manufacturer shall ensure that interfacing with the agent does not prevent them from completing the requirements outlined in the contract documents.

END OF SECTION

SECTION 26 0450

CABINETS AND ENCLOSURES

PART 1 - GENERAL

Applicable Provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install hinged cover enclosures to complete all work shown on the Drawings or specified herein.

1.2 REFERENCES

- A. NEMA 250 - Enclosures for electrical equipment (1000 volts maximum).
- B. Submittals - Submit product data under Provisions of Contract and Division 1.

PART 2 - PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; Type 1 and 3R steel.
- B. Finished: Manufacturer's standard enamel finish.
- C. Covers: Continuous hinge, held closed by operable by key.
- D. Provide barriers between normal and emergency wiring. Barriers shall be of non-current carrying material of adequate thickness for mechanical strength but in no case less than 1/4". Each barrier shall have an angle iron framing support all around.

2.2 FABRICATION

- A. Shop assemble enclosures in accordance with ANSI/NEMA ISC 6.
- B. Provide knockouts on enclosures.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install enclosures plumb; Anchor securely to wall and structural supports at each corner, minimum.
- B. Provide necessary feet for free-standing equipment enclosures.
- C. Install trim plumb.

END OF SECTION

SECTION 26 0500

SUPPORTING DEVICES

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install rigid metal conduit, electrical metallic tubing and flexible metal conduit, including all fittings to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.3 REFERENCES

- A. Conduit supports.

1.4 QUALITY ASSURANCE

- A. Support system shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Support channel: Galvanized or painted steel.
- B. Hardware: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, outlet, junction boxes to building structure using preset inserts, beam clamps and spring steel clips.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; Expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- D. Do not use powder-actuated anchors.
- E. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

- F. In wet locations install free-standing electrical equipment on concrete pads.
- G. Install surface mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.
- H. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

END OF SECTION

SECTION 26 0550

GENERAL LABELING AND IDENTIFICATION

PART 1 - GENERAL

Applicable Provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all material, labor, tools and services necessary to install nameplates, tape labels, wire markers, conduit color coding to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Painting.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 1.
- B. Include schedule for nameplates and tape labels.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background.
- B. Tape labels: Embossed adhesive tape with 3/16 inch black letters on a white background.
- C. Wire and cable markers: Cloth markers, split sleeve or tubing type.

PART 3 - EXECUTION

3.1 INSTALLATION

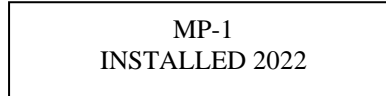
- A. De-grease and clean surfaces to receive nameplates and tape labels.
- B. Install nameplates and tape labels parallel to equipment lines.
- C. Secure nameplates to equipment fronts using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.
- D. Embossed tape will not be permitted for any application. Use embossed tape only for identification of individual wall switches and receptacles and control device stations.

3.2 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes and at load connection. Identify each branch circuit or feeder number for power and lighting circuits and each control wire number as indicated on equipment manufacturer's shop drawings for control wiring.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates to identify all electrical distribution, control equipment and loads served including year of installation. Letter height: 1/2 inch for individual switches, loads served, distributions and control equipment identification. For example:



- B. Panelboards: 3/4 inch, identify equipment designation. 1/2 inch, identify voltage rating and source of power.
- C. Individual circuit breakers, switches and motor starters in panelboards, switchboards and motor control centers: 1/4 inch, identify circuit and load served, including location.
- D. Individual circuit breakers, enclosed switches and motor starters: 1/2 inch, identify load served.

3.4 FIRE ALARM

- A. All fire alarm raceway components shall be painted red and identified.

END OF SECTION

SECTION 26 0575

INTERIOR LUMINAIRES

PART 1 - GENERAL

Applicable provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. Interior luminaires and accessories.
- B. Emergency lighting units.
- C. Exit signs.
- D. LED Driver.
- E. LED dimming and controls.
- F. LED emergency power supply.
- G. Lamps.
- H. Luminaire accessories.

1.2 REFERENCES

- A. ANSI/IES RP-16-10 – Nomenclature and Definitions for Illuminating Engineering.
- B. ANSI C78.37 7 – Specifications for the Chromaticity of Solid-State Lighting (SSL) Products.
- C. IES LM-79-08 – Electric and Photometric Measurements of Solid-State Lighting Products.
- D. IES LM-80-08 – Measuring Lumen Maintenance of LED Light Sources.
- E. IES 7M-21-11 – Projecting Long Term Lumen Maintenance of LED Light Sources.
- F. IES LM-82-11 – IES Approved Method for the Characterization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature.
- G. UL 8750 – LED Equipment for Use in Lighting Products.
- H. NEMA WD 6 - Wiring Devices – Dimensional Requirements.
- I. NFPA 70 - National Electrical Code.
- J. NFPA 101- Life Safety Code.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and to requirements of NFPA 101.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. (UL), American National Standards Institute (ANSI) and Illuminating Engineering Society (IES).

1.5 SUBSTITUTIONS

- A. All proposed substitutions must be submitted with each light fixture specification cutsheet, accompanied with footcandle calculation for all spaces, provided for Architect and Engineer's review, prior to approval.
- B. If the substitution is accepted, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.

PART 2 - PRODUCTS

2.1 LUMINAIRES

- A. Furnish Products as scheduled.

2.2 EXIT SIGNS

- A. Manufacturers: As scheduled.
- B. Description: Exit sign fixture suitable for use as emergency lighting unit.
- C. Housing: Extruded aluminum or steel as per schedule.
- D. Face: Aluminum stencil face with red letters, unless otherwise noted.
- E. Directional Arrows: Universal type for field adjustment, direction per drawing.
- F. Mounting: Universal, for field selection or per drawing.
- G. Lamps: L.E.D.
- H. Input Voltage: As scheduled.

2.3 LED DRIVERS

- A. Manufacturers: As scheduled.
- B. Voltage: As scheduled.

2.4 LAMPS

- A. Lamp Types: As specified for luminaire. LED source.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

- B. Support luminaires 2 x 4 foot (600 x 1200 mm) and larger in size independent of ceiling framing.
- C. All lay-in luminaries shall be supported with chains to building structure.
- D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- E. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.
- F. Install wall mounted luminaires, emergency lighting units and exit signs at 80" above finished floor, unless otherwise noted.
- G. Install accessories furnished with each luminaire.
- H. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- I. Bond products and metal accessories to branch circuit equipment grounding conductor.
- J. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

3.2 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

- A. Aim and adjust luminaires as indicated.
- B. Position exit sign directional arrows as indicated.

3.4 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finished and touch up damage.

3.5 PROTECTION OF FINISHED WORK

- A. Relamp luminaires that have failed lamps as substantial completion.

END OF SECTION

SECTION 26 0600

DISCONNECT SWITCHES

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install disconnect switches, fuses and enclosures to complete all work shown on the Drawings or specified herein.

1.2 SUBMITTALS

- A. Submit product data under Provisions of Contract and Division 1.
- B. Include outline Drawings with dimensions, equipment ratings for voltage, capacity, horsepower and short circuit.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

- A. Siemens.
- B. Square 'D'.
- C. General Electric.
- D. Or approved equal.

2.2 DISCONNECT SWITCHES

- A. Fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch is in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate class R, J fuses.
- B. Non-fusible switch assemblies: Quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- C. Enclosures: NEMA Type 1; 3R; 4 as indicated on Drawings.

2.3 ACCEPTABLE MANUFACTURERS - FUSES

- A. Bussman.
- B. Ferraz-Shawmut.
- C. Or approved equal.

2.4 FUSES

- A. Fuses 600 amperes and less: ANSI/UL 198E, class RK1; RK5; Dual element, current limiting, time delay, 250 volt.
- B. Interrupting rating: 200,000 rms amperes.
- C. An additional fuse of each size required to be supplied.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install fuses in fusible disconnect switches.
- C. Disconnects installed outdoors shall have NEMA 3R enclosures.
- D. Disconnects installed indoors in dry locations shall have NEMA 1 enclosure.

END OF SECTION

SECTION 26 0650

GROUNDING

PART 1 - GENERAL

Applicable provisions of the conditions of the Contract and Division 1 General Requirements govern the work in this section. Submit shop drawings for checking and approval.

1.1 WORK INCLUDED

- A. The work under this section shall include the furnishing of all materials, labor, tools and services necessary to install the power system grounding to complete all work shown on the Drawings or specified herein.

1.2 RELATED WORK

- A. Panelboards.
- B. Raceways.
- C. Connection Equipment.
- D. Electric Equipment.
- E. Tests and Acceptance.
- F. Transformers.
- G. Electric Service.

1.3 SUBMITTALS

- A. Manufacturers' data, catalog cuts of ground rods, connectors, bushings, etc., along with recommended installation procedures.

PART 2 - PRODUCTS

2.1 WIRING

- A. All wiring used for grounding shall be insulated copper, unless otherwise noted. Size shall be in accordance with code for the application, minimum #12.
- B. Where used in conjunction with computer equipment, grounding conductors shall be equal in size to the phase conductors.
- C. Avoid splices in ground conductors.

2.2 RACEWAY

- A. Grounding continuity shall be maintained for all metallic raceways.
- B. Provide bonding jumpers across metal parts separated by non-conducting materials.
- C. Where a grounding conductor is installed as a supplement to metallic raceway serving as the equipment grounding conductor, bonding conductor to the raceway at each end.
- D. All raceway accessories, such as locknuts, bushings, expansion fittings, etc. shall be installed to provide maximum metal-to-metal bonding.

2.3 CLAMPS

- A. Provide approved ground clamps for connecting grounding conductors to pipe, conduits, wireways, building steel, grounding rods, etc.
- B. Where bond will be in an inaccessible location or as an alternate to ground clamps, provide exothermic weld, similar to Cadweld.

2.4 ACCESSORIES

- A. Provide all necessary accessories of appropriate size and material for connection or termination of grounding conductors including:
 - 1. Straps.
 - 2. Clamps.
 - 3. Lugs.
 - 4. Bars and buses.
 - 5. Isolators (where applicable).
 - 6. Locknuts and bushings.

2.5 ACCEPTABLE MANUFACTURERS

- A. Copperweld.
- B. Cadweld (for exothermic welds).
- C. O.Z. Gedney.
- D. Burndy.

PART 3 - EXECUTION

3.1 SERVICE ENTRANCE/SWITCH

- A. Coordinate all bonding and grounding requirements of the service entrance with the utility company.
- B. Provide ground lug in each switchboard, minimum 25% of phase bus, along entire length of switchboard.
- C. Separately connect each ground to existing grounding electrode. Test existing grounding electrode for proper resistance values and provide all necessary modifications required.

3.2 TRANSFORMERS

- A. Bond each transformer secondary neutral to nearest building structural column or beam via transformer case grounding stud.
- B. Provide jumper between transformer case and all conduit bushings.
- C. Where a separate equipment-grounding conductor is provided the primary and/or secondary feeders; bond to transformer grounding stud.
- D. Where isolation shield is provided, bond to transformer grounding stud.
- E. Where a separate ground riser is provided in addition to or instead of building steel; bond transformer-grounding stud to the ground riser.

3.3 STRUCTURAL STEEL BUILDINGS

- A. Select a column common to aligned electric closets as the bonding column for grounding of transformer neutrals, isolated grounds and separate equipment grounding conductors.
- B. All grounding conductors in each closet shall be bonded in close proximity to one another.
- C. Where a grounding conductor to be bonded is not in proximity to the common column, bond to the nearest column or structural beam.
- D. Provide bonding jumper strap across all structural expansion joints where the grounding integrity of the structural system is reduced

3.4 RACEWAYS

- A. Grounding continuity is to be maintained for all metallic raceways. Provide necessary clamps, bushings, straps and locknuts to assure continuity.
- B. For non-metallic or flexible raceways, provide a separate equipment-grounding conductor bonded to both ends.
- C. Where indicated, an additional equipment-grounding conductor shall be provided in metallic raceway.
- D. Where indicated, an isolated ground conductor shall be provided in addition to the equipment-grounding conductor. Bond at each end to the isolated ground terminal identified.

3.5 EQUIPMENT

- A. All equipment shall be grounded.
- B. Where isolated grounding is indicated, it shall be for the isolation of internal equipment components only. All metallic enclosures of such equipment shall be connected to the equipment ground system.

3.6 PANELBOARDS

- A. All panelboards and distribution panels shall be provided with a ground bar bonded to the enclosure. Provide an isolated ground bar connected to the incoming feeder ground where indicated.

3.7 TESTING

- A. Upon completion of the installation, confirm the grounding continuity of all raceways, conductors and equipment. Maximum allowable resistance is 25 ohms.

3.8 RECORD DRAWINGS

- A. Submit record As-Built Drawings indicating the location of all points where grounding conductors are bonded to steel, rods, plates, etc.
- B. Indicate the location of all grounding buses not installed within distribution equipment.

END OF SECTION

SECTION 26 0800

FIRE ALARM SYSTEM

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 FIRE ALARM SYSTEM

- A. The existing fire alarm system is an addressable system. The fire alarm control panel is located in the boiler room.
- B. Add and modify as required to the existing system, as specified/shown on the drawings and as per field requirements. All devices shall be suitable for operation and compatible with existing system. Provide relays modules, cards, power supplies, etc. as required.
- C. Provide sufficient quantity of relays for fan shutdown as specified/shown on Drawings.
- D. Connect, test and leave the system in first class operating condition.
- E. The system shall maintain all applicable Local, State and National Codes including the National Electrical Code, NPFA-72, NFPA-101, ADA 1971 and NEC. The system shall be listed by Underwriter's Laboratories, Inc.
- F. The Electrical Contractor shall provide a manufacturers certified technician to supervise installation, adjustments, final connection and system testing.
- G. Fire alarm wiring and cable shall be per manufacturer's requirements.
- H. Fire alarm system test shall be in accordance with NFPA-72 and local fire department requirements.

END OF SECTION

SECTION 26 0825

PUBLIC ADDRESS SYSTEM

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section. Submit shop drawings for checking and approval.

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all equipment, accessories and material required for the installation of communication devices in strict compliance with these Specifications and applicable Contract Drawings. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this specification.

PART 2 - PRODUCTS

2.1 SPEAKERS

- A. Flush Speaker Baffles (ceiling): Ceiling Speakers shall be Rauland USO-188/ACC1000 white semi-gloss enamel steel grille with 8" speaker, 25/70 volt 7 watt transformer and 6 oz. magnet mounted on a # ACC1101 steel protective cover and a ACC1104 tile bridge support.
- B. Enhanced Staff Stations
 - 1. Room phones shall be Rauland Model 2554W-VP vandal proof, where indicated. Enhanced staff stations can dial administrative stations, initiate emergency calls, and enable or disable the reception of program material at their location. Depending upon the level of system access, enhanced staff stations can dial other staff stations, perform all-call, zone pages, conference calls and call transfer.
 - 2. Staff stations can be assigned to initiate calls at three levels; normal/emergency, urgent/emergency, and emergency. Emergency calls ring the administrative phone with a special tone and will interrupt a non-emergency call in progress. An integral emergency announce feature (no external amplifier necessary) gets prompt attention when needed by routing unanswered emergency calls to a designated emergency station. Emergency calls continue to ring until answered.
- C. Clock/Speaker Baffles (room)
 - 1. The room flush mount clock/speaker/ baffle shall be a Lowell BP-300 combination baffle mounted on a flush back box PC-312 with 8" speaker, 25 volt 7 watt transformer, 6 oz. magnet and 9" system secondary clock. Speakers shall be a Rauland USO 188 Speaker/Transformer with 8", 25/70 volt 7 watt transformer and 6 oz. magnet. Clocks shall be National Time 030-12EX-LL-SP analog synchronous secondary clocks with hourly and daily correction.
- D. Analog Synchronous Clock with Minute and Second Hands
 - 1. The secondary clock shall be a National Time 030-12EX-LL-SP series clock. It shall be designed to be 3-wire system with Rauland TC-21 Master Clock systems. The secondary clock shall have a microprocessor-based movement and shall be capable of being used as a stand-alone clock. The clock shall have a low-profile /semi-flush smooth surface metal case. The crystal shall be shatterproof polycarbonate with no visible molding marks. Glass is unacceptable. The clock shall have black hour and minute hands and a red second hand. The clock shall have U.L., cUL and F.C.C. compliances.

END OF SECTION

SECTION 26 0900

GUARANTEE

PART 1 - GENERAL

Applicable Provisions of the Conditions of the Contract and Division 1 General Requirements govern work in this section.

1.1 GUARANTEE

- A. The Contractor shall remove, replace and/or repair at his own expense and at the convenience of the Owner, any defects in workmanship, materials, ratings, capacities and/or characteristics occurring in the work within one (1) year or within such longer period as may be provided in the Drawings and/or Section of the Specifications, which guarantee period shall commence with the final acceptance of the entire Contract in accordance with the guarantee provisions stated in the General Conditions, and the Contractor shall pay for all damage to the system resulting from defects in the work and all expenses necessary to remove, replace, and/or repair any other work which may be damaged in removing, replacing and/or repairing the work.

END OF SECTION

**SECTION 31 2316
EXCAVATION**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Excavating, trenching, and backfilling for retaining walls, site structures, concrete sidewalks, ramps, stairs, site utilities, and paving.
- B. Dewatering.
- C. Temporary excavation support and protection systems.
- D. Preparing subgrades for all excavate areas.
- E. Drainage course.
- F. Select fill.
- G. Final grading

1.3 RELATED REQUIREMENTS

- A. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- B. Section 01 7000 - Execution: Project conditions; protection of bench marks, scoping, survey control points, temporary bracing and shoring, dewatering, and water control.
- C. Section 03 3000 - Cast-in-Place Concrete.
- D. Section 32 1216 - Asphalt Paving.
- E. Section 32 1313 - Concrete Paving and Curbs.
- F. Section 32 3113 - Chain Link Fences and Gates.
- G. Section 32 3121 - Aluminum Louver Fence and Gates.
- H. Section 32 3136 - Security Gates and Barriers
- I. Section 32 9220 - Restoration of Turf Areas.
- J. Section 32 3230 - Site Furnishings.
- K. Refer to Appendix for Geo-Tech Report and Borings.

1.4 REFERENCE STANDARDS

- A. All references apply to the latest revisions of the publications.
- B. ASTM D422: Particle Size Analysis of Soils
- C. ASTM D1556: Density and Unit Weight of Soil in Place by the Sand-Cone Method
- D. ASTM D1557: Laboratory Compaction Characteristics of Soil Using Modified Effort
- E. ASTM D2922: Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
- F. ASTM D2974: Moisture, Ash and Organic Matter of Peat and other Organic Soils
- G. ASTM D3017: Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- H. ASTM D4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)
- I. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Geotechnical Engineer shall submit copies of reports to YPS Office of Facilities Management. Include date of site visit, description of work observed, and summary of observations and recommendations.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Refer to individual sections for additional requirements
- C. Project Record Documents: Record drawings at project closeout according to Section 01 7800 - Closeout Submittals. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- D. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.
- E. Product Data: For the following:
 - 1. Sieve Analysis, Proctor Compaction Test and Certification of Specification Compliance for each of each fill materials and mix design proposed for flowable fill at least 15 days before start of backfilling. Flowable fill submittal shall include ASTM C 1260 test results.
 - 2. Each type of plastic warning tape.
 - 3. Geotextile.
 - 4. Contractor shall submit copies of proposed materials with locations, methods and operations of backfilling and compaction.
- F. Samples: For the following:
 - 1. 12-by-12-inch Sample of subdrainage and separation geotextile.
 - 2. A 25-pound sample of each type of off-site fill material that is to be used at the site in an air-tight container for the testing laboratory, a minimum of one week prior to delivery to the site. Submit samples to the YPS Office of Facilities Management. Use of these proposed materials by the Contractor prior to testing and approval or rejection shall be at the Contractor's own risk.
- G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Refer to individual sections for additional requirements.
 - 2. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 3. Laboratory compaction curves according to ASTM D 2487 for each on-site or borrow soil material proposed for fill and backfill.
 - 4. Optimum moisture-maximum density curve for each soil material.
 - 5. Submit the name of each supplier and specific type and source of each material. Any change in source throughout the job requires approval of the YPS Office of Facilities Management.
 - 6. Submit soil test reports for organic content of loam from off-site sources. Loam shall closely match the approved samples and not be delivered to the site prior to receiving approval of the soil test report.
- H. Pre excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.7 QUALITY ASSURANCE

- A. Comply with: New York State Department of Transportation (NYSDOT) "Standard Specifications for Construction and Materials". Notify YPS Office of Facilities Management of conflicts with these specifications.
- B. Routine testing of existing soils and compacted material for compliance with these specifications will be performed as part of Contractor responsibility.

1. Compacted material not meeting density requirements shall be removed or re compacted and retested at Contractor's expense.
2. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
 - a. Pre installation Conference: Conduct conference at Project site to comply with requirements of Division 1.
3. Section 01 3000 - Administrative Requirements for Project Meetings.
 - a. Before commencing earthwork, meet with YPS Office of Facilities Management, Geotech Engineer, Contractor, and Testing Agency and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
4. Codes and Standards: Perform earthwork complying with requirements of State New York Uniform Fire and Building Code and authorities having jurisdiction.
5. Testing and Inspection Service: Contractor will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations to include but not be limited to the following:
 - a. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
 - a) Field reports; in-place soil density tests.
 - b) One optimum moisture-maximum density curve for each type of soil encountered.
 - c) Inspections and certifications shall be performed by a licensed engineer registered in the State of New York.

1.8 DEFINITIONS

- A. Excavation shall mean the excavation, removal, stockpiling, and/or satisfactory disposal of all materials encountered within the limits indicated or specified other than rock or ledge. Excavated materials shall include, but not be limited to removal of material encountered above subgrade elevations indicated, earth materials such as peat, organic or inorganic silts, clay, sand, gravel, pavements, cobble and boulders less than 1.0 cubic yard in volume, soft or disintegrated rock which, in the opinion of the YPS Office of Facilities Management, can be removed without blasting or drilling; pavement, brick and concrete masonry, and all obstructions not specifically included in another Section and subsequent disposal of materials removed
- B. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of YPS Office of Facilities Management. Unauthorized excavation and remedial work directed by YPS Office of Facilities Management shall be at Contractor's expense.
 1. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification unless otherwise directed by YPS Office of Facilities Management.
- C. Excavation classified as "unclassified" and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered, pavements and other obstructions visible on ground surface, underground structures, utilities and other items indicated to be demolished and removed, together with earth and other materials, including rock.
- D. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- E. Fill: Soil materials used to raise existing grades.

- F. Drainage Fill: Layer supporting concrete pavement, stairs, ramps, retaining walls , site utilities, and manholes used to minimize capillary flow of pore water.
- G. Select Fill: Soil material to raise existing grades supporting concrete pavement, stairs, ramps, site utilities, and manholes.
- H. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- I. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt road and pavement walk.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below select fill, drainage fill, and topsoil materials.
- L. Controlled Low Strength Material:

1.9 PROJECT CONDITIONS

- A. **Refer to Section 01 7000 for scoping requirements.**
- B. Verify existing grades and notify YPS Office of Facilities Management of differing conditions.
- C. Verify that survey bench mark and intended elevations for the Work are as indicated.
- D. Project Site Information: A geotechnical report has not been prepared for this Project.
- E. The contractor, subject to approval of the YPS Office of Facilities Management may make additional test borings and conduct other exploratory operations as necessary.
- F. Existing Utilities: Locate existing underground utilities in work area before starting earthwork operations.
 - 1. Where utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. If uncharted or incorrectly charted piping or other utilities are encountered during excavation, consult with utility YPS Office of Facilities Management immediately for directions. Cooperate with YPS Office of Facilities Management and public and private utility companies to keep services and facilities in operation. Repair damaged utilities as required by utility owner.
 - a. Do not interrupt existing utilities serving facilities occupied by YPS Office of Facilities Management or others during occupied hours except when permitted in writing by YPS Office of Facilities Management and then only after acceptable temporary utility services have been provided.
 - a) Provide minimum two (2) or five (5) days notice to YPS Office of Facilities Management and receive written notice to proceed before interrupting utilities.
- G. Demolish and remove from site existing underground utilities indicated to be removed. Coordinate with utility companies and MEP prime contractors for shutoff of services if lines are active.

1.10 OWNER'S RESPONSIBILITY

- A. The Owner will provide an existing conditions survey of the property which is incorporated into the Contract Drawings.
- B. The Owner reserves the right to change final grades.

1.11 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall provide adequate personnel and equipment to complete the Work as specified herein and within the agreed upon Project Construction Schedule. The Contractor shall employ qualified English-speaking supervisor who shall provide adequate and efficient coordination of the Work. The supervisor shall be present on the site on a continuous full-time basis and shall have the authority to act on behalf of the Contractor.
- B. The Contractor shall provide adequate survey control to locate building lines, parking areas, driveways, top of slopes, and toe of slopes, etc. within the horizontal dimensions shown on the Contract Drawings.

He shall also provide adequate vertical control to establish site grades as shown on the Contract Drawings, within the tolerances as specified hereinafter.

- C. Prior to the beginning of any site grading, the Contractor shall make sufficient checks on the topographic conditions to satisfy him/herself that the existing elevations are as shown by the topographic survey and on the Contract Drawings. Should any discrepancies be found they shall be reported to the YPS Office of Facilities Management and Fuller and D'Angelo, P.C. in writing prior to commencement of any work.
- D. The Contractor shall review all Drawings, Specifications and all other information included in Contract Documents and shall determine the quantities of the work to be completed and be responsible for the assumptions made in determining the cost of the Work.
- E. The Contractor shall coordinate and complete his work in such a manner as to interfere as little as possible with all other contractors and/or subcontractors working on the site.

1.12 PROTECTION

- A. The Contractor shall contact Dig Safe a minimum of 48 hours prior to performing any excavation and shall maintain current Dig Safe authorization numbers during all excavation activities. Protect structures, utilities, monitoring wells, property monuments, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. The Contractor shall be responsible for actual cost of repair or replacement of any items damaged as a result of construction activities, including any professional services required for inspection of repairs and replacement.
- B. Trees and Shrubbery:
 - 1. Existing trees and shrubbery to remain shall be protected from injury during construction.
 - 2. Except as otherwise directed, cutting and trimming of existing trees will not be permitted.
 - 3. All existing trees to remain and which may be damaged by construction operations shall be boxed and placed and protected and all such protection shall be maintained until completion of the work.
- C. Existing Utilities:
 - 1. Excavation and backfill operations shall be done in such a manner as to prevent cave-ins of excavations or the undermining, damage, or disturbing of existing utilities and structures or of new work.
 - 2. Backfill shall be placed and compacted so as to prevent future settlement or damage to existing utilities, structures, new work, and in accordance with the requirements of the particular utility company.
 - 3. Any excavation improperly backfilled or where settlement occurs shall be reopened to the depth required, then refilled with new materials and compacted, and the surface restored to the required grade and condition, at no additional cost to the Owner.
- D. Paved surfaces:
 - 1. Do not operate equipment that will cause damage on paved surfaces that are to remain. Any damage to existing roads or other paved surfaces caused by construction equipment shall be repaired at no additional cost to Owner.
- E. Property:
 - 1. Any damage due to excavation, backfilling or settlement of the backfill or injury to persons or damage to property occurring as a result of such damage, shall be the responsibility of the Contractor. All costs to repair such damage, in a manner satisfactory to the Owner, shall be borne by the Contractor, at no additional cost to the Owner.

1.13 PRODUCT HANDLING

- A. Store materials to preserve their quality and fitness for work.

1.14 WORKMANSHIP

Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by YPS Office of Facilities Management.

- A. Remove work found to be defective. Replace with new acceptable work.

PART 2 PRODUCTS -

2.1 UNCLASSIFIED EXCAVATION

- A. Excavation for this project shall be "unclassified".
 - 1. Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
- B. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, other materials or unauthorized excavation.
- C. Pipes and conduits shall be provided with 6 inches of Pipe Zone Bedding material to eliminate differential settlement.

2.2 SOIL MATERIALS

- A. Excavations General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, and PT or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
 - 2. Materials containing excessive amounts of water, plastic clay, vegetation, organic matter, debris, pavement, stones or boulders over 3 inches in greatest dimension, frozen material, and material which, in the opinion of the Geotechnical Engineer will not provide a suitable foundation or subgrade.
- D. General Fill Material: Soil materials free of clay, rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1. **Not to be used against basement or retaining wall.**
- E. Select Fill: Sound and durable, well-graded sand and gravel, free of deleterious materials such as pyritic shale, organics, or contaminants of a chemical, mineral, or biological nature and conforming to New York State Department of Transportation, paragraph 304-2.02, Type 2 and the following limits of gradation:

100%	passing a 2" sieve.
30-90%	passing a #10 sieve.
10-70%	passing a #40 sieve.
0-5%	passing a #200 sieve

 - 1. Location: Use for sub-base fill under pavements and over undisturbed soil.
- F. Drainage Fill: ASTM C-33 Blend 57, a blend of NYSDOT No. 1 and No. 2 crushed stone that complies with material specification requirements of Article 703-02 for crushed stone and the following limits of gradation:

% Passing By Weight	Sieve Size
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100%	1" sieve.
40-50%	3/4"
25-60%	passing a 1/2" sieve.
10-30%	passing a 3/8" sieve
0-10%	passing a # 4 sieve.
0-5%	passing a # 8 sieve

1. Location: Under slabs on grade, sidewalks, ramps, concrete stairs, footings, piers, and retaining walls.concrete pavement, stairs, ramps, site utilities, and manholes

G. Bedding and Pipe Encasement Course:

1. Select mixture of graded thoroughly washed crushed stone free from organic, frozen or other deleterious materials, conforming to the requirements of NYS DOT Section 703-02 and meeting the following gradation requirements (except material from trenching operations may be used if meeting the following:

100% passing a 1" sieve.
90-100% passing a 1/2" sieve.
0-15% passing a 1/4" sieve.

- a. Location: water, sanitary, sprinkler, and conduit.

100%	passing a 1" sieve.
30-100%	passing a 1/2" sieve.
0-30%	passing a 1/4" sieve
0-10%	passing a #10 sieve.
0-5%	passing a #20 sieve.

H. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

1. Location: Copper and polyethylene tubing.

I. Topsoil : Friable loam; local borrow.

1. Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.
2. Graded.
3. Free of roots, rocks larger than 1/2 inch (12 mm), subsoil, debris, large weeds and foreign matter.
4. Furnish a certified analysis, made by a recognized authority, of any topsoil furnished to complete the work of planting. Test reports shall match the format listed below:

Passing	Retained Percentage	
1" screen	100%	
1" screen	1/4" screen (gravel)	Not more than
3%		
1/4" screen	No. 100 (sand)	40% - 60%
No. 100(Very fine sand, silt and clay)	40% - 60%	

- J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a very stiff state.
- K. Follow NYSDOT Standard Specifications if gradation data varies from those listed above for approval.
- L. Recycled material shall not be permitted.
- M. Slag of any kind shall no be permitted.

2.3 ACCESSORIES

A. Bedding and Fill to Correct Over-Excavation:

1. Select Fill.

- B. Underground Warning Tapes:
1. Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

2.4 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
1. Survivability: Class 2; AASHTO M 288.
 2. Grab Tensile Strength: 157 lbf ; ASTM D 4632.
 3. Sewn Seam Strength: 142 lbf ; ASTM D 4632.
 4. Tear Strength: 56 lbf ; ASTM D 4533.
 5. Puncture Strength: 56 lbf ; ASTM D 4833.
 6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
 7. Permittivity: 0.5 per second, minimum; ASTM D 4491.
 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
 9. Product: Filter Fabric: "Geotex 351" by Propex Geosynthetics; "Mirafi 140N" by Mirafi, Inc.; or accepted equivalent.
 10. Location: All underground drainage piping, catch basin and manholes.

2.5 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:
1. Portland Cement: ASTM C 150, Type I, II, or III.
 2. Fly Ash: ASTM C 618, Class C or F.
 3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch nominal maximum aggregate size.
 4. Foaming Agent: ASTM C 869.
 5. Water: ASTM C 94/C 94M.
 6. Air-Entraining Admixture: ASTM C 260.
 7. Produce low-density, controlled low-strength material with the following physical properties:
 - a. As-Cast Unit Weight: 36 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
 - b. Compressive Strength: 80 psi, when tested according to ASTM C 495.
 - c. Location: Over all utilities passing under vehicular traffic

PART 3 EXECUTION

3.1 TOPSOIL STRIPPING AND STOCKPILING

- A. Stripping and Stockpiling of Topsoil: Strip topsoil from areas to be excavated or filled, areas within proposed building limits and paving areas and stockpile where shown on the plans. Stockpiled topsoil shall be free of subsoil, stones, clods of hard earth, plants or their roots, sticks or other matter not conducive to plant growth. Stockpiling shall be coordinated by the Contractor and shall comply with the requirements of Section .
1. All top soil removed from the site shall be inventoried and quantities submitted to the YPS Office of Facilities Management

3.2 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
 - 1. Resurvey benchmarks during installation of excavation support and protection systems and notify Yonkers Public Schools if any changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

3.3 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Fuller and D'Angelo, P.C..
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- F. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.
- G. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- H. Protect and maintain erosion and sedimentation controls, which are specified in Section Site Clearing" during earthwork operations.

3.4 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrade, and from flooding Project site, and surrounding area.
- B. Protect subgrade from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install continuous dewatering system, as required to keep subgrade dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
- C. The Contractor shall provide, maintain and operate pumps of adequate capacity required to maintain excavations, pits, trenches and depressions within the Contract Limit Lines as well as the Buildings free of water accumulated at any time and as necessary to permit the proper installation of the work required under all contracts. Disposal of pumped water shall be done with due respect to the rights of adjoining buildings. All costs in connection with the removal of water as above provided for shall be borne by the Contractor.

3.5 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.6 EXCAVATING GENERAL

- A. Underpin adjacent structures that could be damaged by excavating work.
- B. Excavate to accommodate new structures and construction operations.
 - 1. Excavate to the specified elevations.

2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
 3. Cut utility trenches wide enough to allow inspection of installed utilities.
 4. Hand trim excavations. Remove loose matter.
 5. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- C. Notify YPS Office of Facilities Management of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Provide temporary means and methods, as required, to remove all water from excavations until directed by . Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- F. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- G. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

3.7 SUBGRADE PREPARATION

- A. See Section 31 2316.13 for subgrade preparation at utility trenches.

3.8 FILLING AND BACKFILLING

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.
- B. Install underground warning tape at buried utilities according to Section 22 0553, 23 0553, and 26 0553..

3.9 REPAIR

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

3.10 STABILITY OF EXCAVATIONS

- A. Comply with Section 31 42 60 Excavation Support and Protection.

3.11 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Remove topsoil and the existing building foundation backfill from the entire building footprint.
 2. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 3. When rock is encountered, remove additional 12" of material and provide compacted drainage fill to eliminate differential settlement.
 4. Footing adjacent to existing building shall bear at same elevation or deeper.
 5. Excavation for Basins Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch .

3.12 EXCAVATION FOR WALKS AND PAVEMENTS

- A. See Section 32 1313 - Concrete Paving and Curbs for excavation and backfilling requirements. Construct to indicated cross sections, elevations, and grades.
- B. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades

3.13 EXCAVATION FOR ASPHALT PAVING AND WALKS

- A. See Section 32 1216 - Asphalt Paving for excavation and backfilling requirements. Construct to indicated cross sections, elevations, and grades.

3.14 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches on each side of pipe or conduit.
 - 2. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
 - 3. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 - 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
 - 5. Bed pipe in bedding and backfill material as described in Part 2, including 6 inches below pipe to 12 inches above pipe. Material shall be thoroughly compacted.
 - 6. The balance of the trench shall be filled with bedding or backfill material placed in 12 inch maximum lifts thoroughly compacted to subgrade for crushed stone drainage layer or to subgrade for pavement stone base as applicable.

3.15 SUBGRADE INSPECTION

- A. Notify YPS Office of Facilities Management when excavations have reached required subgrade.
- B. If Testing Laboratory determines that unsatisfactory soil is present, notify the YPS Office of Facilities Management prior to proceeding. At the direction of the YPS Office of Facilities Management, continue excavation and replace with compacted backfill or select fill material as directed.
 - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction[, repeating proof-rolling in direction perpendicular to first direction]. Limit vehicle speed to 3 mph .
 - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by YPS Office of Facilities Management, and replace with compacted backfill or select fill as directed.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by YPS Office of Facilities Management, without additional compensation.

3.16 UNAUTHORIZED EXCAVATION

- A. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by ,YPS Office of Facilities Management without additional compensation.

3.17 STORAGE OF SOIL MATERIALS

- A. Stockpile borrows material and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Provide tarp or erosion control fabric on stockpile material and a silt fence around stockpiled material.
 - 3. Material stockpiled outside the contract area shall be in locations approved by the Owner. If areas are not available store material off site at contractor's expense.

3.18 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring, bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.19 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section Cast-in-Place Concrete
- D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.
- E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch , to a height of 12 inches over the utility pipe or conduit.
 - 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- F. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.
- G. Coordinate backfilling with utilities testing.
- H. Backfill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- I. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- J. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.
- K. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.20 FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material and drainage fill.
 - 3. Under steps and ramps, use select fill and drainage fill.
 - 4. Under building footings, foundations and slabs on grade, use select fill and drainage fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.21 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.22 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 98 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 98 percent.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.

3.23 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch .
 - 2. Walks: Plus or minus 1/2 inch .
 - 3. Pavements: Plus or minus 1/2 inch .

3.24 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
 - 3. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.
 - 4. Where topsoil is to be placed, scarify surface to depth of 3 inches (75 mm).
 - 5. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).

3.25 SUBSURFACE DRAINAGE

- A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch (150-mm) course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches (300 mm) of filter material, placed in compacted layers 6 inches (150 mm) thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
- B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with 1 layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches .
 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
 2. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.26 SELECT FILL COURSES

- A. Place select fill course free of mud, frost, snow, or ice.
- B. Place select fill course as follows:
 1. When thickness of compacted course is 6 inches or less, place materials in a single layer.
 2. When thickness of compacted course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches thick when compacted.
 3. Compact select fill course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 1557

3.27 DRAINAGE FILL

- A. Under slabs-on-grade, pavements, walks, ramps, and stairs place drainage course on prepared subgrade and as follows:
 1. When compacted thickness of drainage course is 6 inches or less, place materials in a single layer.
 2. When compacted thickness of drainage course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches thick when compacted.
 3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.28 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Fuller and D'Angelo, P.C. before placement of foundations.
- C. Testing Agency: The YPS Office of Facilities Management will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- D. Allow testing agency to inspect and test the following:
 1. Confirmation of existing structure, foundation depths and undisturbed soil levels.
 2. Compaction of in place soil.
 3. Supply and compaction of select fill.
 4. Subgrade and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 1. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by YPS Office of Facilities Management

2. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 3. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
 4. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.29 CLEANING

- A. Remove excavated material that is unsuitable for re-use from site.
- B. Remove excess excavated material from site.

3.30 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.
- F. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- G. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- H. Scarify or remove and replace soil material to depth as directed by YPS Office of Facilities Management; reshape and recompact.
- I. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
- J. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.31 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove all surplus soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Refer to Section 01 7420 - Site Waste Handling and Disposal for additional requirements.

END OF SECTION

SECTION 31 2513

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill and Compaction: Section 31 2301.

1.2 REFERENCES

- A. Erosion and Sediment Control Guidelines: Conform to the latest edition of "NEW YORK STANDARDS and SPECIFICATIONS for EROSION and SEDIMENT CONTROL" by NYS Department of Environmental Conservation DOW (i.e., Bluebook). Refer to these guidelines for construction and maintenance of all items (Temporary and Permanent Structural, Vegetative and Biotechnical) included in the Storm Water Pollution and Prevention Plan (SWPPP).
- B. Storm Water Management: Conform to the latest edition of "NEW YORK STATE STORMWATER MANAGEMENT DESIGN MANUAL" prepared by Center for Watershed Protection for NYS Department of Environmental Conservation.

1.3 RESPONSIBILITY

- A. Install and maintain the temporary storm water and diversion control items as shown on the drawings before starting any grading or excavation. Provide any temporary sediment and erosion control measures that may be required within limits of the work, including any staging areas, throughout construction in conformance with the plan, and as directed by the Owner's Representative. Place the permanent control practices required before the removal of the temporary storm water diversion and control items.
- B. Inspection shall be completed daily by Contractor's Representative to ensure functionality of all sediment and erosion control devices. Any deficiencies should be repaired/replaced on an as needed basis.
- C. During construction conduct operations in such a manner as to prevent or reduce to a minimum any damage to any water body from pollution by debris, sediment, chemical or other foreign material, or from the manipulation of equipment and/or materials in or near a stream or ditch flowing directly to a stream. Any water which has been used for wash purposes or other similar operations which become polluted with sewage, silt, cement, concentrated chlorine, oil, fuels, lubricants, bitumens, or other impurities shall not be discharged into any water body.
- D. During construction, any deficiencies observed and noted within the Owner's representatives weekly report shall be corrected within 24-hours. All reports shall be circulated to the City's staff.
- E. In the event of conflict between these specifications and the regulation of other Federal, State, or local jurisdictions, the more restrictive regulations shall apply.

1.4 DESCRIPTION

- A. The Work shall consist of furnishing, installing, inspecting, maintaining, and removing soil and erosion control measures as shown on the contract documents or as ordered by the Owner's Representative during the life of the contract to provide erosion and sediment control.

- B. Temporary structural measures provide erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion. These are used during construction to prevent offsite sedimentation. Temporary structural measures shall include check dams, construction road stabilization, stabilized construction entrance, dust control, earth dike, level spreader, perimeter dike/swale, pipe slope drain, portable sediment tank, rock dam, sediment basin, sediment traps, silt fence, storm drain inlet protection, straw/hay bale dike, access waterway crossing, storm drain diversion, temporary swale, turbidity curtain, water bars or other erosion control devices or methods as required.
- C. Permanent structural measures also control protection to a critical area. They are used to convey runoff to a safe outlet. They remain in place and continue to function after completion of construction. Permanent structural measures shall include debris basins, diversion, grade stabilization structure, land grading, lined waterway (rock), paved channel, paved flume, retaining wall, riprap, rock outlets, and stream bank protection or other erosion control devices or methods as required.
- D. Vegetative measures shall include brush matting, dune stabilization, grassed waterway, vegetating waterway, mulching, protecting vegetation, seeding, sod, straw/hay bale dike, stream bank protection, temporary swale, topsoil, and vegetating waterways.
- E. Weekly inspections will be completed by the Owner's Representative. Comply with and correct all deficiencies found as a result of these inspections. At the end of the construction season when soil disturbance activities will be finalized or suspended until the following spring, the frequency of the inspections may be reduced. If soil disturbance is completely suspended and the site is properly stabilized, a minimum of monthly inspections must be maintained. The stabilization activities must be completed before snow cover or frozen ground. If vegetation is required, seeding, planting and/or sodding must be scheduled to avoid die-off from fall frosts and allow for proper germination/establishment. Weekly inspections must resume no later than March 15.

1.5 DEFINITIONS – TEMPORARY STRUCTURAL MEASURES

- A. Construction Road Stabilization: Stabilization of construction roads to control erosion.
- B. Stabilized Construction Entrance: A stabilized pad of aggregate underlain with geo-textile where traffic enters a construction site to reduce or eliminate tracking of sediment to public roads.
- C. Dust Control: Prevent surface and air movement of dust from disturbed soil surfaces.
- D. Silt Fence: A barrier of geo-textile fabric installed on contours across the slope to intercept runoff by reducing velocity. Replace after 1 year.
- E. Storm Drain Inlet Protection: A semi-permeable barrier installed around storm inlets to prevent sediment from entering a storm drainage system.

1.6 DEFINITIONS – PERMANENT STRUCTURAL MEASURES

- A. Retaining Wall: A structural wall constructed to prevent soil movement down steep slopes.
- B. Riprap: A layer of stone designed to protect slopes that are subject to erosion.

1.7 DEFINITIONS – VEGETATIVE MATERIALS MEASURES

- A. Protecting Vegetation: Protecting trees, shrubs, ground cover and other vegetation from damage.

- B. Temporary Seeding: Erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.
- C. Permanent Seeding: Grasses established and combined with shrubs to provide perennial vegetative cover on disturbed, denuded, slopes subject to erosion.
- D. Sod: Used where a quick vegetative cover is required.
- E. Topsoil: Placed before permanent seeding or sod is installed.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Seeding: Permanent see Section 329219.

2.2 COMPANIES-TEMPORARY STRUCTURAL

- A. Mirafi, 365 South Holland Drive, Pendergrass, Ga, 30567, (888) 795-0808, www.mirafi.com.
- B. North American Green, 14649 Highway 41 North, Evansville, IN 47725, (800) 772-2040, www.nagreen.com.
- C. Siltdam Inc., P.O. Box 960, Brockton MA, 02303, (800) 699-2374, www.spilldam.com.
- D. Nedia Enterprises, Inc., 22187 Vantage Pointe Place, Ashburn, VA 20148, (888) 725-6999, www.nedia.com.
- E. Belton Industries, 5600 Oakbrook Parkway, Norcross GA., 30093, (800) 225-4099, www.beltonindustries.com.
- F. KriStar, 1219 Briggs Ave., Santa Rosa, CA 95401, (800) 579-8819, www.kristar.com.
- G. Rolanka International Inc., 155 Andrew Drive, Stockbridge GA 30281, (800) 760-3215, www.rolanka.com.
- H. Apex Resources Inc., 12910 Shelbyville Road, Louisville, KY 40243 (888) 677-2739, www.apexr.com.
- I. MonoSol, LLC, 707 E. 80th PL., Merrillville, IN 46410 (800) 237-9552, www.terraloc.com.
- J. Brockton Equipment Inc., P.O. Box 960, Brockton, MA 02303 (800) 699-2374, www.spilldam.com.
- K. Aer-Flo Inc., 4455 18th St. East, Bradenton, FL 34203 (800) 823-7356, www.aerflo.com.
- L. Contech Construction Products Inc., 9025 Centre Point Drive, Suite 400, West Chester, Ohio 45069, (800) 338-1122, www.contech-cpi.com.
- M. ACF Environmental, 2831 Cardwell Road, Richmond, VA 23234, (800) 488-3636, Acfenvironmental.com

2.3 COMPANIES-VEGETATIVE

- A. Nedia Enterprises, Inc., 22187 Vantage Pointe Place, Ashburn, VA 20148, (888) 725-6999, www.nedia.com.
- B. Agrecol Corporation, 2918 Agriculture Drive, Madison, WI, 53718, (608) 226-2544, www.agrecol.com.

PART 3 EXECUTION

3.1 WORK AREAS

- A. The Owner's Representative has the authority to limit the surface area of erodible earth exposed by earthwork operations and to direct the Contractor to provide immediate temporary or permanent erosion measures to minimize damage to property and contamination of watercourses and water impoundments. Under no circumstances will the area of erodible earth material exposed at one time exceed 50,000 sq. ft. The Owner's Representative may increase or decrease this area of erodible earth material exposed at one time as determined by his analysis of project, weather and other conditions. The Owner's Representative may limit the area of clearing and grubbing and earthwork operations in progress commensurate with the Contractor's demonstrated capability in protecting erodible earth surfaces with temporary, permanent, vegetative or biotechnical erosion control measures.
- B. Schedule the work so as to minimize the time that earth areas will be exposed to erosive conditions. Provide temporary structural measures immediately to prevent any soil erosion.
- C. Provide temporary seeding on disturbed earth or soil stockpiles exposed for more than 7 days or for any temporary shutdown of construction. In spring, summer or early fall apply rye grass at a rate of 1 lb/ 1000 sq.ft. In late fall or early spring, apply certified Aroostook Rye at a rate of 2.5 lbs./ 1000 sq. ft. Apply hay or straw at a rate of 2 bales/ 1000 sq. ft. or wood fiber hydromulch at the manufacturer's recommended rate. Hay or straw shall be anchored.
- D. Coordinate the use of permanent controls or finish materials shown with the temporary erosion measures.
- E. All erosion and sediment control devices must be maintained in working order until the site is stabilized. All preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, re-seeding, or re-mulching, must be performed immediately.
- F. After final stabilization has been achieved temporary sediment and erosion controls must be removed. Areas disturbed during removal must be stabilized immediately.

END OF SECTION

**SECTION 32 1216
ASPHALT PAVING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Aggregate base course.
- B. Road and Parking Paving: Double course bituminous concrete paving.
- C. Walkway Paving: Single course bituminous concrete paving.
- D. Asphalt Repairs.
- E. Surface sealer.

1.3 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 32 1313 - Concrete Paving and Curbs: Concrete curbs.
- C. Section 32 1723.13 - Painted Pavement Markings.
- D. Section 33 0561 - Concrete Manholes: Manholes, including covers and frames for placement by this section.

1.4 REFERENCE STANDARDS

- A. New York State Department of Transportation
- B. AI MS-2 - Asphalt Mix Design Methods; 2015.
- C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt
1. Pavements," unless more stringent requirements are indicated.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Job-Mix Designs: For each job mix proposed for the Work.
- D. Indicate, with international graphics symbol, spaces dedicated to people with disabilities
- E. Shop Drawings: pavement markings, lane separations, and defined parking spaces.
- F. Qualification Data: For manufacturer.
- G. Material Test Reports: For each paving material.
- H. Material Certificates: For each paving material, signed by manufacturers.

1.6 QUALITY ASSURANCE

- A. Manufacturer shall be a paving-mix manufacturer registered with and approved by the New York DOT.
- B. Perform Work in accordance with State of New York Highways standard.

- C. Obtain materials from same source throughout.

1.7 FIELD CONDITIONS

- A. Prime and Tack Coats: Minimum surface temperature of 60 deg F
- B. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.
- C. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- D. Place bitumen mixture when temperature is not more than 15 F degrees (8 C degrees) below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Asphalt concrete and all related items shall meet the requirements of NYSDOT Section 400
- B. Aggregate for Base Course shall be Type 4 and conform to the requirements of Section 304 of the NY State DOT Specifications.
 - 1. Gradation shall conform to the following:

a.	Sieve Size Designation	Percent Passing by Weight
b.	3 inch	100%
c.	2 inch	90-100%
d.	1/4 inch	30-65%
e.	No. 40	5-40%
f.	No. 200	0-1%
- C. Binder Course: Type 3, NYSDOT Sections 401, 403
- D. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- E. Water: Potable.
- F. Surface Course: Type of, NYSDOT Sections 401, 403
- G. Primer: In accordance with State of New York Highways standards.
- H. Tack Coat: In accordance with State of New York Highways standards 702-90.
- I. Seal Coat: AI MS-19, slurry type.

2.2 ASPHALT PAVING MIXES AND MIX DESIGN

- A. Refer to NYDOT Specification.
- B. Submit proposed mix design of each class of mix for review prior to beginning of work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
- D. Review condition of subgrade and preparatory work.
- E. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

3.2 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct lay down and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
- D. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
- E. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- F. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- G. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- H. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- I. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- J. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.3 AGGREGATE BASE COURSE

- A. Proof roll subbase surface with a ten (10) ton static steel wheel roller to check for unstable or otherwise unsuitable areas, as determined by the Architect. Replace and recompact all unsatisfactory areas, as approved by the Architect, prior to commencement of paving operations.
- B. Construction of crushed stone base shall be in accordance with the applicable requirements of Section 304 of the New York State Specifications and as required herein.

3.4 PREPARATION - PRIMER

- A. Apply primer in accordance with State of New York Highways standards.
- B. Use clean sand to blot excess primer.

3.5 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with State of New York Highways standards.
- B. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.6 PLACING ASPHALT PAVEMENT - SINGLE COURSE

- A. Asphalt concrete shall not be applied on a wet surface or when the air temperature is below 45 degrees F. unless otherwise directed, or when weather conditions would prevent proper construction
- B. Install Work in accordance with State of New York Highways standards 400 unless otherwise specified..
- C. Place asphalt within 24 hours of applying primer or tack coat.
- D. Place asphalt to 3 inch (76 mm) compacted thickness thickness identified in schedule at end of Section.

- E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.7 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

- A. Place asphalt binder course within 24 hours of applying primer or tack coat.
- B. Place asphalt binder course to 3 1/2 inch (89 mm) compacted thickness identified in schedule at end of section.
- C. Place asphalt wearing course within two hours of placing and compacting binder course.
- D. Place asphalt wearing course to 2 inch (50 mm) compacted thickness identified in schedule at end of section.
- E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.8 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
 - 4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
 - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 - 6. Compact asphalt at joints to a density within 2 percent of specified course density

3.9 PATCHING AND REPAIRS

- A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Recompact new subgrade. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically.
 - 1. Tack coat faces of excavation and allow to cure before paving.
 - 2. Fill excavation with dense-graded, hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.
 - 3. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.
- B. Leveling Course: Install and compact leveling course consisting of dense-graded, hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
 - 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- C. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of 1/4 inch (6 mm). Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints.
- D. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, hot-mix asphalt pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface.
 - 1. Allow tack coat to cure undisturbed before paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.10 CURBS Refer to Section 32 1313

3.11 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.
- B. Compacted Thickness: Within 1/4 inch (6 mm) of specified or indicated thickness.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements

3.12 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.13 DISPOSAL

- A. Except for material indicated to be recycled, if any, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
- B. Do not allow excavated materials to accumulate on-site

3.14 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for three (3) days or until surface temperature is less than 140 degrees F (60 degrees C).

3.15 SCHEDULE

- A. Heavy Duty Road Paving: Double course of: 8" base course; 3-1/2" binder course and 2" surface course: 12" inch (_____ mm) compacted thickness, and seal coat.
- B. Walkway Paving: Single course of: 6" base course and 3" surface course compacted thickness, and seal coat.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING AND CURBS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Concrete sidewalks, stair steps, and integral curbs.
- B. Abrasive metal nosing for concrete stairs.
- C. Concrete Admixtures.
- D. Miscellaneous site concrete.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 05 5213 - Pipe and Tube Railings.
- C. Section 07 9200 - Joint Sealants: Sealing joints.
- D. Section 09 9113 - Exterior Painting: Pavement markings.
- E. Section 31 2316 - Excavation: Preparation of site for base and preparation of subsoil.
- F. Section 32 1216 - Asphalt Paving: Asphalt wearing course.
- G. Section 32 1726 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.
- H. Section 33 0561 - Concrete Manholes: Manholes, including frames; gutter drainage grilles, covers, and frames for placement by this section.

1.4 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- C. ACI 305R - Guide to Hot Weather Concreting; 2010.
- D. ACI 306R - Guide to Cold Weather Concreting; 2016.
- E. ACI 308 - Standard Specification for Curing Concrete
- F. ACI 309R - Guide for Consolidation of Concrete
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary
- H. ACI 357 - Guide for the Design and Construction of Fixed Offshore Concrete Structures
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- J. ASTM A 706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
- K. ASTM A 820 / A 820M - Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
- L. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars. - 2017

- M. ASTM A884 Standard Specification For Epoxy-Coated Steel Wire And Welded Wire Fabric For Reinforcement - 2014
- N. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- O. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- Q. ASTM C 138 / C 138 M - Standard Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- R. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- U. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- V. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing compounds.
 - 5. Bonding agent or adhesive.
 - 6. Joint fillers.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- B. Installer Qualifications: An experienced installer, with a minimum of five (5) years experience, who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Hydrophobic Concrete Admixture Manufacturer Qualifications: Hydrophobic Concrete Admixture Manufacturer will have a minimum of five (5) years of documented experience on projects of similar scope.
- D. Ready-Mixed Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.
 2. Verification of Performance: Provide ready-mixed concrete from a concrete supplier approved by the Hydrophobic Concrete Admixture Manufacturer and authorized to dispense the Hydrophobic Concrete Admixture Manufacturer's waterproofing materials.
- E. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1.7 PRE-INSTALLATION CONFERENCE

- A. Attendance: YPS Office of Facilities Management, Fuller and D'Angelo, P.C., Contractor, Manufacturer's Representative, and batch plant representative and those requested to attend.
- B. Meeting Time: Minimum of three (3) weeks prior to the beginning of the work of this Section and work of related Sections affecting the work of this Section.
- C. Location: Project site.
- D. Review procedures for conducting work of this Section, including:
1. Review of mix design and mix test results.
 2. Mixing procedure.
 3. Conditions for acceptance of concrete at project site.
 4. Placement procedures.
 5. Finishing options and procedures.
 6. Curing and crack control procedures.
 7. Testing for acceptable moisture emissions, alkalinity pH levels, and relative humidity of concrete slab prior to installation of finish flooring.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Conform to provisions of the Section 01 6000 - Product Requirements and the Hydrophobic Concrete Admixture Manufacturer instructions.
- B. Mixing and Delivery: Conform to ASTM C94.
- C. Sampling at Delivery: Conform to ASTM C172. Cure 4-inch by 8-inch cylinders to provisions of ASTM C31 and compression test compressive strength of cylinders to ASTM C39.
- D. Batch Tickets: Conform to ASTM C94 Option A or C. Accompany each load, fully executed, and signed. Log in with inspector at time of entry. Conform to Source Quality Control requirements specified by this Section.
1. Include water content and water withheld at batch plant.
 2. Indicate time to nearest minute that batch was dispatched from plant, when it arrived at site, and when unloading began and was finished.
 3. Indicate ambient air temperature and concrete internal temperature at time of arrival.
 4. Make written record of water and other additives added to design mix, and the amount of concrete in the truck at the time of addition, after the mix truck left the batch plant.
- E. Reject concrete that has reached internal temperature of 89 degrees Fahrenheit or above and when temperature has risen 5 degrees in 10 minutes, indicating concrete is setting up prior to discharge.
- F. Store products in accordance with ACI 301. Do not use admixtures that have been in storage at project site for more than 12 months or which have been subjected to freezing, except as accepted by the Hydrophobic Concrete Admixture Manufacturer and by the structural engineer based on test results

1.9 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Wood form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
 - 1. Thickness: 1/2 inch (12 mm).

2.2 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa) yield strength; deformed billet steel bars; unfinished.
- B. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars. - 2017
- C. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- D. ASTM A884 Standard Specification For Epoxy-Coated Steel Wire And Welded Wire Fabric For Reinforcement - 2014
- E. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi (280 MPa) yield strength; deformed billet steel bars; epoxy coated finish.
- F. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Normal - Type I Portland cement, gray color.
- B. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- C. Water: Clean, and not detrimental to concrete.
- D. Waterproof Concrete Admixture: Water-Based.
 - 1. Acceptable Manufacturers:
 - a. "Hycrete W1002" as manufactured by Hycrete, Inc., 462 Barell Avenue, Carlstadt, New Jersey, 07072, telephone (201) 386-8110, website www.hycrete.com
 - b. Admixture to meet or exceed British Standards Institute (BSI) 1881-122 testing to performance of 50% reduction in water absorption as compared to an untreated concrete control.
 - c. Ready-mixed concrete supplier shall be approved by the Waterproof Concrete Admixture Manufacturer and authorized to dispense the Waterproof Concrete Admixture Manufacturer's waterproofing materials.
 - 2. Substitutions: Refer to Section 01 2500 Substitution Procedures.

2.4 ACCESSORIES

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
- C. Tactile Warning Surfaces: See Section 32 1726.

- D. Expansion Joint Cap Strip: Extruded, plastic, removable strip made specifically for forming recessed joint. Vynlex, Knoxville, TN 37921 (615) 690-2211.
- E. Abrasive Stair Nosings: Consisting of an abrasive non-slip filler bonded and locked into channels in an extruded aluminum base, alloy 6063-T6. Coefficient of friction 1.02 dry, 0.98 wet per ASTM F 609. Provide the following:
 - 1. Tread Cast aluminum solid surface tread plate 5/16 inch thick with continuous wing anchor 1-1/4 inches deep.
 - a. 4 inches wide, lip 1/4 inch from underside.
 - 2. Space anchors 3" from ends.
 - 3. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete
 - 4. Product:
 - a. American Safety Tread, Style 801 "alumacast" (cast aluminum). PO Box 611, Helena, AL 35080.
 - b. Substitutions: Refer to Section 01 2500 Substitution Procedures.

2.5 CONCRETE MIX DESIGN

- A. Concrete Properties:
 - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4,000 psi.
 - 2. Air Content: 6.0 percent for 3/4-inch (19-mm) maximum aggregate.
 - a. Exposed concrete shall be provided with air entraining of mixture.
 - 3. Maximum Slump: 4 inches (100 mm).
 - 4. Maximum Aggregate Size: __ inch (3/4 mm).
 - 5. Waterproof Concrete Admixture: As recommended by the manufacturer.

2.6 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. The concrete ready mix supplier must contact the Waterproof Concrete Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics. The concrete ready mix supplier must also report the test results to the Waterproof Concrete Admixture Manufacturer. All values must be within the manufacturer's specification limits.
 - 1. Test result requirements for Waterproof Concrete Admixture in addition to engineer's performance requirements: Corrected thirty (30) minute water absorption, age at test 7 days (BS 1881-122): Not greater than 1.0%
 - 2. All concrete materials used for testing must be same as concrete materials used for construction.
- C. All concrete for exterior exposed concrete including sidewalks, ramps, and steps will be waterproofed by the addition of Waterproof Concrete Admixture and additional ingredients including:
 - 1. Waterproof Concrete Admixture at the rate of one U.S. gallon per cubic yard of concrete
 - 2. Superplasticizer at the manufacturer's recommended rate and appropriate for the placement requirements of the project.
 - 3. Water-Cement Ratio: 0.42 maximum. Water content of Waterproof Concrete Admixture and other admixtures to be included in the water-to-cementitious ratio.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Site verification of conditions:
 - 1. Verify that site conditions are acceptable for placement of waterproofed concrete.

2. Do not proceed with concrete placement until conditions unacceptable to the Hydrophobic Concrete Admixture Manufacturer are corrected.

D. Suitable Condition of Reinforcing Steel:

1. At the time concrete is placed, reinforcement shall be free from mud, oil, or other nonmetallic coatings that decrease bond. Epoxy-coating of steel reinforcement in accordance with standards specified.

3.2 SUBBASE

- A. See Section 31 2316 - Excavation for construction of base course for work of this Section.

3.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.
- C. Notify YPS Office of Facilities Management minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.
- D. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least twenty (24) hours after concrete placement. Provide edge forms for all area where brick pavers or installed in concrete pavements.
- E. Forms for concrete curbs shall be steel or wood, straight or curved sections, free from warp, and of such construction that there will be no interference to inspection for grade or alignment. All forms shall extend for the full curb depth and shall be braced and secured adequately so that no displacement from alignment will occur during placing of concrete.
 1. Monolithic curbs shall be as indicated on drawings.

3.5 REINFORCEMENT

- A. Place reinforcement at top of slabs-on-grade.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.
- D. Provide doweled joints twelve (12) inch (____ mm) on center at interruptions of concrete.

3.6 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.
- D. Provide a minimum 6/6 x 6/6 welded wire fabric in all pavements

3.7 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints and ____ are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

- D. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- E. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
 - 2. Pour all curbs integral with sidewalks.

3.8 WATERPROOF ADMIXTURE

- A. Do not proceed with concrete placement until conditions unacceptable to the Waterproof Concrete Admixture Manufacturer are corrected.
- B. Comply with the Waterproof Concrete Admixture Manufacturer's instructions and recommendations.
- C. Waterstops: Install in accordance with Waterproof Concrete Admixture Manufacturer's recommendations.
- D. Bentonite waterstops:
 - 1. Shall be placed at all cold joints and penetrations
 - 2. Preparation:
 - a. Brush off all dust and debris and apply a coat of primer or spray adhesive to the area where the waterstop is to be placed on the standing structural member.
 - b. Using moderate hand pressure press a continuous bead of waterstop firmly into position on the standing structure. Check to be certain that the waterstop has bonded to the primed area.
 - c. For proper joining, cut ends with sharp tool at 45 degree angle, and then place ends over one another
 - d. Peel the protective backing from the exposed side of the waterstop. Knead the overlapped ends together to form continuous, uninterrupted gasket.
 - e. For shotcrete applications, in addition to the instructions above, utilize masonry nails to hold the waterstop in place on the concrete. Masonry nails should be spaced approximately 12 inches apart. Waterstop must be glued and tied with the use of tie wires to all penetrations.
 - f. Bentonite waterstops must not be installed more than 2 days prior to concrete placement. After installation of waterstops, cover the waterstop with a plastic sheet to protect from weather damage.
 - g. Bentonite waterstops shall be dry and not activated when concrete is placed. If the waterstops have been water damaged they shall be replaced before the concrete is placed.
- E. Where re-entrant angles occur, three #4 or #5 bars spaced at 3 inches OC at least 3 feet long must be placed top and bottom at 90 degrees across all the angles.

3.9 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch (10 mm) wide expansion joints at 20 foot (6 m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
 - 2. Secure to resist movement by wet concrete.

- C. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- D. Provide scored joints.
 - 1. At 3 feet (1 m) intervals.

3.10 POURED-IN-PLACE CONCRETE CURBS

- A. Concrete curbs shall be as shown on drawings. Where curbs abut walkways the curbs shall be integral with the sidewalk.
- B. Poured-in-place concrete curbs shall conform to NYSDOT Specifications Section 609, "Curbing, Gutters and Concrete Mall" and appropriate materials section(s) 700 series, except as otherwise noted.
- C. Reinforcing: Minimum two #5 rods top and bottom of all curbs.
- D. Concrete shall be compacted with an approved immersion type mechanical vibrator. Forms shall be left in place 24 hours or until the concrete has sufficiently hardened so that they can be removed without injury to the curb. Upon removal of the forms, the exposed faces of the curb shall be immediately rubbed to a uniform surface. Rubbing shall be accomplished by competent finishers. No plastering will be permitted.
- E. Protect concrete surface from loss of surface moisture for at least 6 days by covering with kraft paper. Lap paper, mats 4 inches at edges and ends; seal kraft paper. Burlap is not permitted.
- F. All expansion joints for concrete curbs shall be 1/2 inch premolded nonextruding filler as specified in Part 2 herein. Expansion material shall be one (1) piece to conform to the cross section of the curb.
- G. Curbs shall be cast with expansion joints. Expansion joints shall line up with joints in walk, maximum 15 feet O.C.
- H. The contractor shall keep the concrete curbs clean, aligned and protected from damage until final acceptance of the work. Blow out control joints prior to acceptance. Any curb damaged prior to the final acceptance of the work shall be repaired or replaced at the contractor's expense.

3.11 FINISHING

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius (6 mm radius).
- B. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius (6 mm radius).
- C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.12 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch (6 mm).

3.13 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd (76 cu m) or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.

- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.14 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Protect installed work from damage due to subsequent construction activity on the site.
- C. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 32 1723.13
PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Parking lot markings, including parking bays, arrows, and handicapped symbols.
- B. Roadway lane markings and crosswalk markings.

1.3 RELATED REQUIREMENTS

- A. Section 32 1216 - Asphalt Paving.
- B. Section 32 1313 - Concrete Paving and Curbs.
- C. Section 32 1726 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.4 REFERENCE STANDARDS

- A. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective; 2007d (Validated 2017).
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paint in containers of at least 5 gallons (18 L) accompanied by batch certificate.
- B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTSCOLOR(S) AS INDICATED

2.1 MATERIALS

- A. Line and Zone Marking Paint: Waterborne acrylic alkyd traffic marking paint; color(s) as indicated.
 - 1. Roadway Markings: yellow.
 - 2. Parking Lots: white.
 - 3. Handicapped Symbols: Blue.

4. Product: Pro-Park made by Sherwin Williams.
 5. Substitutions: Section 01 2500 Substitution Procedures.
- B. Paint For Obliterating Existing Markings: FS TT-P-1952; black for bituminous pavements, gray for portland cement pavements.
- C. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.
- D. Tactile Warning Surfaces: See Section 32 1726.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify YPS Office of Facilities Management of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
 2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
- E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.
- F. Temporary Pavement Markings: When required or directed by YPS Office of Facilities Management, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
 2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Yonkers Public Schools.

3.3 INSTALLATION

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F (10 degrees C) or more than 95 degrees F (35 degrees C).
- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
- D. Comply with FHWA MUTCD manual (<http://mutcd.fhwa.dot.gov>) for details not shown.
- E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

- F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
 - 1. Apply paint in one coat only.
 - 2. Wet Film Thickness: 0.015 inch (0.4 mm), minimum.
 - 3. Length Tolerance: Plus or minus 3 inches (75 mm).
 - 4. Width Tolerance: Plus or minus 1/8 inch (3 mm).
- G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
 - 1. Mark the International Handicapped Symbol at indicated parking spaces.
 - 2. Hand application by pneumatic spray is acceptable.
- H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.4 DRYING, PROTECTION, AND REPLACEMENT

- A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.
- B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.
- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
- E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.
- F. Replace removed markings at no additional cost to Yonkers Public Schools.

END OF SECTION

SECTION 32 1726
TACTILE WARNING SURFACING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for sidewalks and platforms.
- B. Section 32 1313 - Concrete Paving and Curbs: Concrete sidewalks.
- C. Section 32 1723.13 - Painted Pavement Markings: Crosswalk and curb markings.

1.4 REFERENCE STANDARDS

- A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA); current edition.
- B. AASHTO LRFD - Bridge Design Specifications; 2017.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2018.
- E. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2011.
- F. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2014.
- G. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- H. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
- I. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.
- J. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2016.
- K. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002 (Reapproved 2013).
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018b.
- M. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- N. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; 2011.
- O. FED-STD-595C - Colors Used in Government Procurement (Fan Deck); 2008 (Chg Notice 1).

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Samples: For each product specified provide two samples, 8 inches (203 mm) square, minimum; show actual product, color, and patterns.

- D. Shop Drawings: Submit plan and detail drawings. Indicate:
 - 1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
 - 2. Sizes and layout.
 - 3. Pattern spacing and orientation.
 - 4. Attachment and fastener details, if applicable
- E. Warranty: Submit manufacturer warranty; complete forms in Yonkers Public Schools's name and register with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience in the manufacturing of Cast In Place Detectable/Tactile Warning Surface Tiles.
- B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.
- B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F (4 and 32 degrees C).

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

PART 2 PRODUCTS

2.1 TACTILE AND DETECTABLE WARNING DEVICES

- A. Vitrified Polymer Composite (VPC) Cast In Place Detectable/Tactile Warning Surface Tiles shall be an epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes. The tile shall incorporate an in-line pattern of truncated domes
 - 1. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90° raised points 0.045" high, per square inch.
- B. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, measuring nominal 0.2" height, 0.9" base diameter, and 0.45" top diameter, spaced center-to-center 2.35" as measured "In Line" integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
- C. Material Properties:
 - 1. Water Absorption: 0.05 percent, maximum, when tested in accordance with ASTM D570.
 - 2. Slip Resistance: 1.18 Dry / 0.88 minimum dry static coefficient of friction, when tested in accordance with ASTM C 1028
 - 3. Compressive Strength: 26,900 pounds per square inch (___ MPa), minimum, when tested in accordance with ASTM D695-02a.
 - 4. Tensile Strength: 12,800 pounds per square inch (___ MPa), minimum, when tested in accordance with ASTM D638-03.
 - 5. Flexural Strength: 31,300 pounds per square inch (___ MPa) minimum, when tested in accordance with ASTM D790-03.
 - 6. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D1308.

7. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.
8. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
9. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM C1026 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other detrimental defects.
10. Accelerated Weathering: Delta-E of less than 5 at 2,000 hours exposure, when tested in accordance with ASTM G155-05a, as well as no deterioration, fading or chalking of surface of tile color No 33538.
11. Loading: No damage when tested according to AASHTO LRFD test method HS20.
12. Salt and Spray Performance: No deterioration or other defect after 300 hours of exposure, when tested in accordance with ASTM B117-03.
13. Linear Thermal Expansion 9.45×10^{-7} per °Fahrenheit when tested in accordance to ASTM D 696-03.
14. Hazardous Classification: Non-Hazardous by RCRA-C.
15. Embedment flange spacing shall be no greater than 3.1" center to center spacing as illustrated on the product Cast In Place drawing
16. Installation Method: Cast in place replaceable.
17. Shape: Rectangular.
18. Dimensions: 24 inches by 36 inches (610 mm by 914 mm).
19. Pattern: In-line pattern of truncated domes complying with ADA Standards.
20. Color: FED-STD 595C, Table IV, Federal Yellow No. 33538. Color shall be homogeneous throughout the tile.
21. Products:
 - a. Access Tile ACC-R-2436-XX a brand of Access Products, Inc; Cast in Place Replaceable Tactile Warning Tile: www.accesstile.com.
 - b. Substitutions: Refer to Section 01 2500 Substitution Procedures

2.2 ACCESSORIES

- A. Anchors: Manufacturere's Hexagonal anchor.

PART 3 EXECUTION

3.1 EXAMINATION

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
 1. If existing conditions are not as required to properly complete the work of this section, notify Fuller and D'Angelo, P.C..
 2. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.2 INSTALLATION, GENERAL

- A. Install in accordance with manufacturer's written instructions.
 1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
 2. Do not install when ambient or substrate temperature has been below 40 degrees F (4 degrees C) during the preceding 8 daylight hours.
- B. Field Adjustment:
 1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.

2. Orient so dome pattern is aligned with the direction of ramp.
 3. Align truncated dome pattern between adjacent units.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.

3.3 INSTALLATION, CAST IN PLACE PLASTIC TILES

- A. Concrete:
1. See Section 03 3000.
- B. When installing multiple adjacent units, leave a 3/16 inch (5 mm) gap between units to allow for expansion.
- C. Tamp and vibrate units as recommended by manufacturer.
- D. Place and position weights on units while concrete cures as recommended by manufacturer. Ensure no voids or air pockets exist between top surface of concrete and underside of units.
- E. The physical characteristics of the concrete shall be consistent with Section 32 1313 - Concrete Paving and Curbs. An overly wet mix will cause the tile to float. Under these conditions, suitable weights such as 2 concrete blocks or sandbags (25 lb) shall be placed on each tile.
- F. The concrete pouring and finishing operations require typical mason's tools, however, a 4' long level with electronic slope readout, 25 lb. weights, and a large non-marring rubber mallet are specific to the installation of the Cast In Place Detectable/Tactile Warning Surface Tile system. A vibrating mechanism such as that manufactured by Vibco can be employed, if desired. The vibrating unit should be fixed to a soft base such as wood, at least 1 foot square.
- G. The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile.
- H. When preparing to set the tile, it is important that no concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Holes in the tile perimeter allow air to escape during the installation process. Concrete will flow through the large holes in each embedment flange on the underside of the tile. This will lock the tile solidly into the cured concrete.
- I. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. The Cast In Place Detectable/Tactile Warning Surface Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The embedment process should not be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface. The contract drawings indicate that the tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes
- J. In cold weather climates it is recommended that the Cast In Place Detectable/Tactile Warning Surface Tiles be set deeper such that the top of domes are level to the adjacent concrete on the top and sides of ramp and that the base of domes to allow water drainage. This installation will reduce the possibility of damage due to snow clearing operations.
- K. Immediately after placement, the tile elevation is to be checked to adjacent concrete. The elevation and slope should be set consistent with contract drawings to permit water drainage to curb as the design dictates. Ensure that the field surface of the tile is flush with the surrounding concrete and back of curb so that no ponding is possible on the tile at the back side of curb.
- L. While concrete is workable, a 3/8" radius edging tool shall be used to create a finished edge of concrete, then a steel trowel shall be used to finish the concrete around the tile's perimeter, flush to the field level of the tile. L. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile that may rock the tile causing a void between the underside of tile and concrete.

- M. Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets. Two suitable weights of 25 lb each may be required to be placed on each tile as necessary to ensure solid contact of the underside of tile to concrete.
- N. Following the concrete curing stage, protective plastic wrap is to be removed from the tile surface by cutting the plastic with a sharp knife, tight to the concrete/tile interface. If concrete bled under the plastic, a soft brass wire brush will clean the residue without damage to the tile surface.
- O. Individual tiles to be bolted together using ¼ inch or equivalent hardware. This will ensure that adjacent tiles are flush to each other during the installation process. Use tape or caulking can be placed on the underside of the bolted butt joint to ensure that concrete does not rise up between the tiles during installation. Any protective plastic wrap which was peeled back to facilitate bolting or cutting, should be replaced and taped to ensure that the tile surface remains free of concrete during the installation process.
- P. Tiles can be cut to custom sizes, or to make a radius, using a continuous rim diamond blade in a circular saw or mini-grinder. Use of a straightedge to guide the cut is advisable where appropriate.

3.4 CLEANING PLASTIC UNITS

- A. Remove protective plastic sheeting within 24 hours of installation.
- B. Remove excess sealant or adhesive from joints and edges.
- C. Clean four days prior to date of scheduled inspection.

3.5 PROTECTION

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION

SECTION 32 3121
ALUMINUM LOUVER FENCE AND GATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Fence framework and accessories.
- B. Fixed louver modular fencing panels .
- C. Manual gates with related hardware.
- D. Accessories.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.
- B. Section 31 2316 - Excavation.

1.4 REFERENCES

- A. ASTM B117 - Operating Salt Spray (Fog) Apparatus.
- B. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- E. ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- F. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on components, accessories,
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.
 - 1. Interface with electric gate operator.
- D. Samples: Submit two samples of slat infill, 8 inch (203 mm) by 12 inch (254 mm) in size illustrating construction and colored finish.
- E. Manufacturer's Installation Instructions: Indicate installation requirements
- F. Copy of warranty specified in Paragraph 1.4 for review by Architect.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years of documented experience.
- B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Provide ten (10) year manufacturer warranty for factory finish against cracking, peeling, and blistering under normal use..

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Ametco Manufacturing Corporation, 4326 Hamann Parkway, P.O. Box 1210, Willoughby, Ohio 44096; 800-362-1360.
 - 1. Substitutions: See Section 001 2500 Substitution Procedures

2.2 MATERIALS

- A. Extruded aluminum: ASTM B221, Alloy 6063, Temper T-6.
- B. Sheet aluminum: ASTM B209, Alloy 6063, Temper T-6.
- C. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing additives

2.3 FENCE SYSTEM

- A. Saturn: Extruded tubular aluminum blades.
 - 1. Type: Ornamental fencing system consisting of vertical, fixed louver, modular fence panels fabricated with extruded aluminum framing bars and supported by extruded aluminum fence posts.
- B. Fence panel:
 - 1. Extruded aluminum sections, powder coat finish, 1/2" x 4" (12.7 x 102 mm) extruded aluminum tubes spaced 1" - 4" (25.4 - 102 mm) apart; fencing to be configured vertically.
 - 2. Height: 10'-0".

2.4 MANUAL GATES AND RELATED HARDWARE

- A. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches (1525 mm) high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, double padlock hasp; keepers to hold gate in fully open position.
- B. Hinges: Finished to match fence components as recommended by the manufacturer.
 - 1. Closing: Manual.
- C. Latches: Finished to match fence components as recommended by the manufacturer.
- D. Gates shall be furnished and installed where indicated on the plans or directed by the YPS Office of Facilities Management. All necessary fittings and gate holders to lock gates in both open and closed positions shall be furnished. The locking device shall be as recommended by the manufacturer. Gates shall be constructed of the same materials and finishes as the fence. All gates shall be braced as recommended by the manufacturer. All gates shall be so arranged that they can be locked when closed and locked back to the fence when open.
- E. Owner will furnish padlocks.

2.5 ACCESSORIES

- A. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- B. Fasteners: Stainless steel.

2.6 FINISHES

- A. Fences and gates shall be manufacturer's standard powder coat colors.
- B. Color(s): To be selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that areas are clear of obstructions or debris.
- B. Verify that site conditions are acceptable for installation. Do not proceed with installation until unacceptable conditions are corrected
- C. Field verify required dimensions. Post spacing as indicated on drawings.

3.2 PREPARATION

- A. Removal: Obstructions or debris.
- B. Coordinate fence and gate installation with provision of gate operator,

3.3 INSTALLATION

- A. Cast concrete footings as detailed on approved shop drawings. Provide setting holes or core drill existing concrete footings for fence post embedment.
 - 1. Temporarily support before permanently setting it into concrete. After the fence is plumb and level, concrete grouting can be poured into post holes
 - 2. Temporarily brace fence posts, then secure fence panels to posts.
- B. Do not install fence panels that are bent, bowed or otherwise damaged.
- C. Space fasteners and secure to posts. Install accessories,
- D. Brace each gate and corner post to adjacent line post with horizontal center brace rail.
- E. Do not attach the hinged side of gate to building wall; provide gate posts.
- F. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- G. Install gate locking device.
- H. Perform three random field inspections confirming proper installation.
- I. Attach aluminum caps to posts and touch up any damaged finish

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm).
- B. Maximum Offset From True Position: 1 inch (25 mm).
- C. Do not infringe on adjacent property lines.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations and underground utilities
- C. Post Settings: Randomly inspect three locations against design for:
 - 1. Hole depth.
 - 2. Hole spacing.
- D. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.
- E. Gates: Inspect for level, plumb, and alignment.
- F. Workmanship: Verify neat installation free of defects.

3.6 CLEANING

- A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material.
- B. Clean fence with mild household detergent and clean water rinse well.
- C. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Demonstrate proper operation of equipment to YPS Office of Facilities Management.

END OF SECTION

**SECTION 32 3300
SITE FURNISHINGS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Benches.
- B. Tree Grates.
- C. Tables.
- D. Waste receptacles.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Bollard and underground encasement..
- B. Section 32 1313 - Concrete Paving and Curbs.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- D. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2014).

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or group of units, elevations with model number, overall dimensions, construction, and anchorage details.
- D. Samples: Submit two sets of manufacturer's available colors for metal furnishings.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty against defects in materials or workmanship for ductile iron castings for a period of 10 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 METAL FURNISHINGS

- A. Metal Furnishings, General:
 - 1. Cast iron components: Ductile iron castings complying with ASTM A536; cleaned, treated, and powder-coated.
 - 2. Steel components: Plates, bars, and shapes complying with ASTM A36/A36M and tubing complying with ASTM A500/A500M; cleaned, treated, and powder-coated.
 - a. Color: As selected by Fuller and D'Angelo, P.C. from manufacturer's standard range.

3. Hardware: Stainless steel.
4. Anchors: Stainless steel
- B. Benches: Metal frame and seat section with back.
 1. Frame: Steel.
 2. Seat: Steel slat.
 3. Length: 72 inches (____ mm).
 4. Width: 25-1/8 inches (____ mm).
 5. Height: 32-1/8 inches (____ mm).
 6. Mounting: Embedded in concrete.
 7. Finish: metal components are steel shot blasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. The thickness of the resulting finish coat averages 8-10 mils (200-250 microns).
 8. Color: As selected from manufacturer's standard.
 9. Products:
 - a. Victor Stanley, Inc; Model FBF-50 : www.victorstanley.com.
 - b. Substitutions: Refer to 01 2500 - Substitution Procedures
- C. Tables: Metal frame.
 1. Configuration: Tables and benches.
 2. Seating: Compliant with ADA Standards.
 3. Shape: Rectangle.
 4. Table:
 - a. Length: 70-1/2 inches (____ mm).
 - b. Width: 11-3/8 inches (____ mm).
 - c. Height: 17-1/2 inches (____ mm).
 5. Seats:
 - a. Length: 72 inches (____ mm).
 - b. Width: 27-1/8 inches (____ mm).
 - c. Height: 30 inches (____ mm).
 6. Material: 1/4" x 1-1/2" (6mm x 38mm) horizontal solid steel slats 3/8" x 1 (10mm x 25mm) solid steel bracing; 1-7/8" (48mm) tubular steel cross-members.
 7. Mounting: Embedded in concrete
 8. Finish: metal components are steel shot blasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. The thickness of the resulting finish coat averages 8-10 mils (200-250 microns).
 9. Color: As selected from manufacturer's standard.
 10. Products:
 - a. Victor Stanley, Inc; Model FBF-56: www.victorstanley.com.
 - b. Substitutions: Refer to 01 2500 - Substitution Procedures
- D. Waste Receptacles: Steel frame with steel slats and removable lid.
 1. Capacity: 30 gallons (114 liters).
 2. Shape: Round.
 3. Diameter: 24-5/8 inches (____ mm).
 4. Height: 41-1/2 inches (____ mm).
 5. Side-access plate with recycle holes for SDC-36.
 6. Hinges: Precision stainless-steel pivot with pins and oil-impregnated bronze bushings
 7. Raised band and decals. Custom decals and plaques.

8. Wall liners: Galvanized steel panels welded inside waste receptacle frame as integral part of waste receptacle unit.
 9. Finish: metal components are steel shot blasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. The thickness of the resulting finish coat averages 8-10 mils (200-250 microns).
 10. Color: As selected from manufacturer's standard.
 11. Finish: Powder coat.
 12. Inserts: Removable plastic containers for waste material.
 13. Lids:
 - a. Material: Steel.
 - b. Type: Domed.
 14. Mounting: Surface.
 15. Security: Keyed lock.
 16. Products:
 - a. Victor Stanley, Inc; SDC-36: www.victorstanley.com.
- E. Tree Grates:
1. Barry Craft Construction Casting Company; Sunburst Design, Model B-TG729-6 Series.: www.mezger.com.
 - a. Size: 72" x 72". (Four Pieces)
 - b. Edge Thickness: 1-1/2".
 - c. Tree Opening: 16" diameter.
 - d. Frame: Type L.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.
- B. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

END OF SECTION

SECTION 32 4100
EXTERIOR SIGN

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Exterior Illuminated Panel Sign.

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-In-Place-Concrete:
- B. Section 26 0553 - Identification for Electrical Systems.
- C. Section 31 2316 - Excavation.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Shop Drawings: Elevations, details, footings and connections.
- D. Provide Colored drawings of exterior sign to the YPS Office of Facilities Management for written approval prior to construction
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- G. Manufacturer's Qualification Statement.
- H. Wiring diagrams.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
- B. Vendor/Installer: Licensed dealers of the manufacturer LED signs, and approved in writing by the Manufacturer. Warranties for above specifications must be in writing from vendor and manufacturer. Website and location of LED manufacturer is to be provided.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Provide a certified letter by the manufacturer stating a "10 Year Parts Availability Guarantee".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. AS per manufacturer's instructions.
- B. Package sign as required to prevent damage before installation.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 5 years years from date of Substantial Completion.

2. Exterior Sign faces will be warranted for the lifetime against vandalism breakage, excluding explosives and gunshots. Replacement faces covered under warranty will be replaced at no charge to the Owner.
3. LED Warranty: 5-Year Parts & In-Factory Labor.

PART 2 PRODUCTS

2.1 EXTERIOR ILLUMINATED PANEL SIGN

- A. Manufacturers
 1. Optec Displays, Inc., Model INFINITY-MOD, 1700 S. De Soto Place, Ontario, CA 91761 USA, 800.876.1668
 2. Substitutions: Section 01 2500 Substitution Procedures.
- B. Model: INFINITY-MOD
 1. Pixel-Pitch: 20mm
 2. Brightness: 10,000 nits +/-
 3. Matrix: 36x120
 4. Color: 281 Trillion Colors
 5. Viewing Angle: 140° Horizontal; 70° Vertical
 6. Contrast Enhancement: Louver w/ Black Textured Mask
 7. Dimming: 100 Levels
 8. Average LED Lifetime: ±100,000* Hours
 9. Color Processing: 16-Bit Grayscale
 10. Color Temperature: 6500K (Adjustable)
- C. Direct Ethernet connection: Provide 300' of Cat5 cable.
- D. LED displays to be FCC Compliant providing non-interference with the wireless spectrum (having an adverse effect on cell phones, air traffic systems and communication in emergency vehicles such as firetrucks, police cars and ambulances).
- E. Graphic & Video Support
 1. Display Capability: Video, Graphic, Text
 2. Video Frame Rate: 60 FPS
 3. Refresh Rate: ±1920 Hz (Adjustable)
- F. LED Cabinet Construction: Aluminum
 1. Cabinet Ventilation: Rear
 2. Serviceability: Front or Rear
 3. Waterproofing (Front/Rear): IP65/IP54 providing total protection from dust ingress as well as from water spray (low-pressure water jets) from any direction.
 4. Manufacturing Quality Standard: ISO 9001
- G. Communication: Ethernet, WiFi, Wireless, Fiber Optic, Cellular
 1. LED Cabinet Size: 2'-4" x 7'-10"
 2. Display to be Borderless (i.e. the cabinet size and the available display area are to be the same)
- H. LED Electrical & Operating Requirements:
 1. AC Power: 120/240VAC 60Hz.
 2. Operating Temp/Humidity: ±-30°~140°F/±10~90%
- I. Redundancy
 1. LED displays to have the ability to receive two sets of power and data signals. In the event one is deficient, the other will automatically take over.
- J. Other LED Requirements

1. Must include time & temperature
 2. Must include photocell
 3. Must include graphics package
- K. Software:
1. M.E. Pro Plus; DNET 3.0
 2. PC / Cloud-Based
 3. Operating Systems: Windows 98/ME/ XP/Vista/Windows 7/8
 4. Advanced scheduling.
 5. Full video capabilities with abilities to import graphic images and video files: gif, .bmp, .png,.avi, .mpeg, .mp4, .flv
 6. Editable message frames with multiple transition effects.
 7. Time and temperature feature.
 8. Preview capabilities by individual or global frame.
 9. Choose content from Animation Library.
 10. Power management function.
 11. Software manuals and free.
 12. Unlimited weekly webinar training.
- L. Zone Management
1. LED signs to have capability of being “partitioned” in up to 12 separate zones. Each zone capable of being programmed to display messages on a separate schedule.
- M. Diagnostic Utility
1. LED displays to include a “Diagnostic Utility” (automated diagnostics and alerts performed automatically. Continual monitoring of display health in the background without disrupting performance.)
- N. Structure:
1. Identification Cabinet:
 - a. Double sided
 - b. Size 2’-6” x 7’-10”
 - c. Aluminum cabinets with Heli-arc welded and reinforced corners
 - d. Acrylic Urethane professional Graffiti Resistant sign paint with touch up included
 - e. Display cabinet will be warranted for the lifetime of the purchasing organization, including electrical components.
 2. Lighting Specifications: (Identification Display)
 - a. Sign to be UL listed.
 - b. Identification cabinets to be internally illuminated via LED modules.
 - c. Electrical components will be warranted for the lifetime of the purchasing organization. Ballasts, lamp sockets and photo-electric cells are warranted components (including labor).
 3. Face Specifications: (Identification Display)
 - a. Sign faces to be manufactured with 3/16” Solar Grade SGC-100 Lexan. Graphics to be applied on the second (inside) surface to avoid scratching and marring.
- O. Support Structure:
1. The support structure is designed and warranted to withstand wind loads of 125 mph.
 2. The support structure shall be 4’ in height from grade to bottom of LED cabinets.
 3. The support structure (legs) shall include cowling.
 4. The support structure will be warranted for the lifetime of the purchasing organization against defects in workmanship and or materials.

- 5. Design and provide footings and foundations as required.
- P. All necessary communication hardware and /or cables must be provided by manufacturer to ensure proper compatibility.
- Q. Training to be provided by software, on line web-based factory classroom service, and continued phone support at no cost to YPS Office of Facilities Management through provider

2.2 ACCESSORIES

- A. Concealed Screws: Security type Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws: Security type Stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 32 9220
RESTORATION OF TURF AREAS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SUMMARY

- A. The contractor shall supply all materials, equipment, labor, incidentals and maintenance required in order to provide an acceptable stand of turf by top soiling and seeding of all disturbed areas including stripping topsoil, grading, placing topsoil, fertilizing and seeding, in accordance with the drawings and as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil
 - 1. Stockpiled topsoil from site preparation, earthwork and trenching operations may be used.
 - 2. Topsoil shall not be used in a muddy or frozen condition.
- B. Fertilizer: 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".
- C. The seed used shall be fresh, re-cleaned seed of the latest crop containing a blend of those listed below and shall be harvested from one field to ensure a uniform color and texture. Percentages of each grass type are to be within the given range for that type:
 - 1. Devine Perennial Ryegrass
 - 2. America Kentucky Bluegrass
 - 3. Apollo Kentucky Bluegrass
 - 4. Limousine Kentucky Bluegrass
 - 5. Midnight Kentucky Bluegrass
- D. Mulch: Mulch shall be approved salt hay or weed free straw and stabilized with a binder.

PART 3 - CONSTRUCTION

3.1 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 YPS Office of Facilities Management before topsoil and seeding.
- C. The approved subgrade shall be scarified to a depth of 2 inches to permit mixing with rootzone material.
- D. Provide minimum 6" topsoil in all areas.

3.2 SEEDBED 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 YPS Office of Facilities Management.
- B. Leveling - Any undulations or irregularities in the surface resulting from fertilization, tillage or any other causes shall be leveled prior to seeding. Flooded, washed out, or otherwise damaged areas shall be reconstructed and all grades reestablished in conformance with the drawings and specifications.

- C. Cleanup - Prior to seeding, the surface shall be cleared of all trash, debris and stone larger than 1-1/2 diameter and of all roots, brush, wire, grade stakes and other objects that could be a hindrance to maintenance operations and use.
- D. Fertilizing - After final seedbed preparation, apply fertilizer at the manufacturer's recommended rate indicated on the bag. Fertilizer shall be distributed evenly over all areas to be seeded by machine, or as otherwise approved by the YPS Office of Facilities Management, and shall be worked lightly into the top 1 inch of the rootzone mixture.

3.3 SEEDING

- A. The contractor shall furnish and place all materials required for seeding in all top soiled areas.
- B. All areas to be seeded 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. Ground limestone and commercial fertilizer shall be applied as specified above.
- C. The soil shall then be raked to a smooth, even draining surface and compacted with an approved roller as directed by the Architect. Any depressions which occur shall be regraded and rerolled until a satisfactory grade is obtained.
- D. The rate of seeding shall be 10 lbs. per 1000 sq. ft. of area. Grass seed shall be sown by approved machine in such manner that a uniform stand will result and as indicated on the drawings for the upper field.
- E. Grass seed shall be sown preferably in the fall between August 25 and October 1, in the spring between March 15 and May 1, or at such other times as are approved by the YPS Office of Facilities Management. All seeding is to be done in dry or moderately dry soil and at times when the wind does not exceed a velocity of 5 miles per hour.

3.4 MULCHING

- A. All seeded areas shall be mulched not later than three (3) days following seeding. Ground surfaces shall be completely covered at a rate of at least two (2) tons per acre.
- B. Mulch shall be anchored using jute or other approved netting properly fastened in place.
- C. Subsequent watering - Seed shall be watered as required to maintain adequate moisture in the soil. In the absence of rainfall, seed shall be watered at frequencies dictated by need.

3.5 HYDROSEEDING

- A. The contractor shall have the option of hydroseeding the lawn areas at no increased cost to the YPS Office of Facilities Management and subject to the written approval of the YPS Office of Facilities Management. If the contractor selects this option, he shall submit to the YPS Office of Facilities Management for approval a complete specification of the hydroseeding operation he intends to follow. Hydroseeding with a cellulose fiber mulch is acceptable.

3.6 MAINTENANCE, REPLACEMENT, GUARANTEE AND FINAL INSPECTION

- A. Maintenance operations shall begin immediately after seeding and shall be continued as required until provisional acceptance. Grass shall be kept in a 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 maintain a strong, vigorous and healthy stand of grass.
- B. Seeded areas that are dead, or in the opinion of the YPS Office of Facilities Management, in an unhealthy, unsightly or badly impaired condition, shall be replaced by the contractor as soon as reasonably possible after the unsatisfactory condition has become evident. No replacement shall be made when weather or

soil is unfavorable for seeding. Such replacements shall be made in the same manner as specified for the original seeding.

3.7 ACCEPTANCE

- A. Inspection of the work of seeding to determine provisional acceptance will be made by the YPS Office of Facilities Management upon written notice requesting such inspection submitted by the contractor at least seven (7) days prior to the anticipated date of inspection. Request may be made subsequent to the second mowing of the turf.
- B. After inspection the Contractor will be notified in writing by the YPS Office of Facilities Management of provisional acceptance of all work, or if there are any deficiencies of the requirements for completion of the work.
- C. All seeded areas shall be guaranteed for one (1) growing season commencing with the date of provisional acceptance.
- D. Upon provisional acceptance, the YPS Office of Facilities Management will assume general responsibility for maintenance of the lawn areas. The contractor shall, however, make periodic visits to the site during the guarantee period to advise the YPS Office of Facilities Management of proper maintenance procedures.
- E. At the expiration of the guarantee period, upon written request of the Contractor, inspection for final acceptance will be made by the YPS Office of Facilities Management. All remedial work to seeding work by the contractor shall be completed prior to the request for final acceptance.

END OF SECTION

**SECTION 32 9300
EXTERIOR PLANTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including School Facilities Management Contract Manual and Specifications and Division 1 Specification Sections, apply to this Section.
- B. In the event of discrepancies between the specifications and School Facilities Management Contract Manual and Specifications the School Facilities Management Contract Manual and Specifications shall prevail.

1.2 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Topsoil bedding.
- C. New trees and plants.
- D. Mulch and Fertilizer.
- E. Maintenance.
- F. Tree Pruning.

1.3 RELATED REQUIREMENTS

1.4 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 REFERENCE STANDARDS

- A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock; 2014.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2017.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Certificate: Submit certificate for plants free of disease or hazardous insects; certified by federal department of agriculture; free of disease or hazardous insects.
- C. Maintenance Data: Include cutting and trimming method; types, application frequency, and recommended coverage of fertilizer.

1.7 QUALITY ASSURANCE

- A. Nursery Qualifications: Company specializing in growing and cultivating the plants with ten (2) years documented experience.
- B. Installer Qualifications: Company specializing in installing and planting the plants with five (5) years experience.
- C. Non-native, Invasive Plant Species: Do not introduce, grow, or cultivate plant species that are non-native to the ecosystem of the project site, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- B. Protect and maintain plant life until planted.

- C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.9 FIELD CONDITIONS

- A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or rise above 90 degrees F (32 degrees C).
- B. Do not install plant life when wind velocity exceeds 30 mph (48 k/hr).

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year warranty.
- C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.
- D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.11 END OF SECTION

- A. See Section 01 7000 - Execution, for additional requirements relating to maintenance service.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

2.2 PLANTS

- A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.3 SOIL MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

2.4 SOIL AMENDMENT MATERIALS

- A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis.
 - 1. Nitrogen: 14 percent.
 - 2. Phosphoric Acid: 28 percent.
 - 3. Soluble Potash: 14 percent.
- B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.
- C. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.
- D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.
- E. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

2.5 MULCH MATERIALS

- A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

2.6 ACCESSORIES

- A. Wrapping Materials: Burlap.

- B. Stakes: Softwood lumber, pointed end.
- C. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.
- D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.
- E. Wrapping: Waterproof fabric.
- F. Tree Protectors: Metal with galvanized rings.

2.7 TOP SOIL MIX

- A. A uniform mixture of 1 part peat and 3 parts topsoil by volume.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared subsoil and planters are ready to receive work.
- B. Saturate soil with water to test drainage.

3.2 PREPARATION OF SUBSOIL

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. Scarify subsoil to a depth of 3 inches (75 mm) where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- D. Dig pits and beds 6 inches (150 mm) larger than plant root system.

3.3 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4 inches (100 mm) over area to be planted. Rake smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches (150 mm).

3.4 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after initial raking of topsoil.
- C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
- D. Lightly water to aid the dissipation of fertilizer.

3.5 PLANTING

- A. Place plants for best appearance for review and final orientation by YPS Office of Facilities Management and Fuller and D'Angelo, P.C.
- B. Set plants vertical.
- C. Remove non-biodegradable root containers.
- D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches (150 mm) under each plant. Remove burlap, ropes, and wires, from the root ball.
- E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch (150 mm) layers. Maintain plant life in vertical position.
- F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.6 PLANT SUPPORT

- A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:
 - 1. Tree Caliper: 1 inch (25 mm); Tree Support Method: 1 stake with one tie
 - 2. Tree Caliper: 1 to 2 inches (25 to 50 mm); Tree Support Method: 2 stakes with two ties
 - 3. Tree Caliper: 2 to 4 inches (50 to 100 mm); Tree Support Method: 3 guy wires with eye bolts and turn buckles
 - 4. Tree Caliper: Over 4 inches (100 mm); Tree Support Method: 4 guy wires with eye bolts and turn buckles

3.7 TREE PRUNING

- A. Prune trees as recommended in ANSI A300 Part 1.
- B. Prune newly planted trees as required to remove dead, broken, and split branches.

3.8 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000.
- B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.9 MAINTENANCE

- A. Provide maintenance at no extra cost to Yonkers Public Schools; Yonkers Public Schools will not pay for water.
- B. Maintain plant life immediately after placement and until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.
- C. Irrigate sufficiently to saturate root system and prevent soil from drying out.
- D. Remove dead or broken branches and treat pruned areas or other wounds.
- E. Neatly trim plants where necessary.
- F. Immediately remove clippings after trimming.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- H. Control insect damage and disease. Apply pesticides in accordance with manufacturers instructions.
- I. Remedy damage from use of herbicides and pesticides.
- J. Replace mulch when deteriorated.
- K. Maintain wrappings, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

END OF SECTION

DRAINAGE STRUCTURES WITH FRAMES AND COVERS

SECTION 33 3913

DRAINAGE STRUCTURES WITH FRAMES AND COVERS

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill and Compaction: Section 31 2301.
- B. Corrugated Polyethylene Storm Drain Pipe: Section 33 4104.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain necessary permits from local Authorities. Ascertain and comply with local requirements for materials, construction and restoration of roadway.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication details and connections to adjacent Work.
- B. Product Data: Manufacturer's catalog cuts, specifications, and installation instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Precast Reinforced Concrete Manholes:
 - 1. Riser Sections: ASTM C 478.
 - 2. Joints Between Riser Sections-One of the following:
 - a. Rubber Gaskets: ASTM C 443.
 - b. Butyl Joint Sealant: ConSeal CS-202 by Concrete Sealants, Inc., 8917 S. Palmer Rd., P. O. Box 176, New Carlisle, OH 45344, (513) 845-8776.
 - 3. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 4,000 psi after 28 days.
 - 4. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
- B. Precast Reinforced Square and Rectangular Concrete Structures:
 - 1. Riser Sections: ASTM C890.
 - 2. Keyed Joints:
 - a. Joint Sealant - Select One:
 - i. Mortar
 - ii. Rubber Gasket
 - iii. Butyl Joint Sealant
 - 3. Load Rating: AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.
 - 4. Concrete for Precast Units: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. Minimum compressive strength of 3,500 psi after 28 days.
- C. Frames, Covers and Grates for Manholes and Catch Basins:
 - 1. Design of each shall be the same throughout the project unless otherwise specified or indicated on the drawings.
 - 2. Units shall meet AASHTO H20 wheel loading requirements. Manufacture, workmanship and certified proof-load tests shall conform to AASHTO M306-89-Standard Specification for Drainage Structure Castings.

DRAINAGE STRUCTURES WITH FRAMES AND COVERS

3. Material:
 - a. Cast iron: ASTM A48, Class 30B or 35B.
 - b. Delivered to Site free of any coatings, unless otherwise specified.
 4. Frames:
 - a. Manholes: Round with a 26-inch clear opening.
 - b. Drain inlets:
 - i. Rectangular with a 24-inch by 24-inch clear opening.
 - c. Curb inlets:
 - i. Rectangular with 30"x48" clear opening.
 5. Solid Covers:
 - a. Round.
 - b. Solid lid, top surface checkered and provided with suitable concealed lifting notches, and lettering cast into cover to indicate type of structure.
 6. Acceptable Manhole Frames and Covers: Pattern 1254 cover by Campbell Foundry Company, 800 Bergen Street, Harrison, NJ 07029, (973) 483-5480
 7. Acceptable Drain Inlet Frames and Gratings:
 - a. Pattern 2815 by Campbell Foundry Company, 800 Bergen Street, Harrison, NJ 07029, (973) 483-5480
 8. Acceptable Curb Inlet Frames and Gratings:
 - a. Pattern 2617 by Campbell Foundry Company, 800 Bergen Street, Harrison, NJ 07029, (973) 483-5480
- D. Pipe-to-Manhole/Drainage Structure Connections-One of the following:
1. A-Lok Flexible Connector by A-Lok Products, Inc., 697 Main St., Tullytown, PA 19007, (215) 547-3366.
 2. Lockjoint Flexible Connector by Chardon Rubber Company, 373 Washington St., Chardon, OH 44024, (216) 285-2161.
 3. Kor-N-Seal Flexible Connector by NPC, Inc., 250 Elm St., Milford, NH 03055, (601) 673-8680.
 4. Link-Seal Flexible Connector by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.
- E. Mortar: ASTM C 270, Type M.

PART 3 EXECUTION

3.1 PREPARATION

- A. Sewer Lateral Openings in Precast and Cast-in-Place Concrete Risers: Provide openings and install pipe connectors in strict accordance with the recommendation of the connector manufacturer.

3.2 INSTALLATION

- A. Construct concrete structures with precast reinforced riser sections to the dimensions shown. Seal joints between precast riser sections with material specified.
1. Wall thickness for rectangular structures: 6 inches.
- B. Position tops of structures flush with finished grade.

DRAINAGE STRUCTURES WITH FRAMES AND COVERS

- C. Cut laterals which will enter above the invert to correct length before installation. Do not cut after installation.

END OF SECTION

SECTION 33 3915

MECHANICAL SEPARATOR

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill and Compaction: Section 31 2301.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain necessary permits from local Authorities. Ascertain and comply with local requirements for materials, construction and restoration of pavement.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication details and connections to adjacent Work.
- B. Product Data: Manufacturer's catalog cuts, specifications, and installation instructions.
- C. Rejection – The Stormwater Treatment System may be rejected for failure to meet any of the requirements of this specification.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Approved Models: First Defense FD-5HC as manufactured by Hydro International. 94 Hutchins Drive, Portland, ME 04102. (207)-756-6200
- B. The treatment system shall be manufactured with materials typically used in stormwater drainage systems that have a minimum life expectancy of 30 years and meet the following requirements:
 - a. Materials of construction shall be cross-linked polyethylene (XLPE) and/or Type 304 stainless steel or carbon steel powder coated in accordance with ASTM 775/ ASTM A775M. All components shall be designed to withstand normal loadings associated with fabrication, shipping, site installation, and normal operation of the equipment.
 - b. Precast shall be manufactured with concrete that has attained a compressive strength of 4,000 psi after 28 days. The structure shall be reinforced to withstand an HS20-44 loading. Shiplap joints shall be sealed with butyl rubber mastic sealant conforming to ASTM C990. Slab tops shall be suitably reinforced and provided with manhole openings and covers as required. The cast iron manhole frames and covers shall be sized as per the manufacturer's drawings and shall be in accordance with ASTM A48, CL.35B and AASHTO M105. The masonry fixing bolts shall be Type 304 stainless steel.
- C. Performance
 - a. Performance of the treatment system shall be based on independent full-scale laboratory testing. The laboratory testing used as the basis of product performance shall be undertaken in accordance with testing protocols approved or endorsed by SWEMA or acceptable State agency, such as a State Department of Environmental Protection (DEP) or recognized verification agency (e.g.: ETV, NJCAT, NETE, MaSTEP).
 - b. Service access to the Stormwater Treatment System shall be provided via 30-inch inner diameter (ID) access riser(s) over the treatment chamber such that no confined space entry is required to perform routine inspection and maintenance functions.

- D. Approved Manhole frame and cover: Standard traffic loading frame and cover for First Defense as recommended and supplied by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

- A. The trench and trench bedding shall be constructed according to ASTM A 798. The structure shall be installed on a stable 6 inch base of fine readily compacted soil free of any foreign materials, stones larger than 3-in. in size or other contaminants.

3.2 INSTALLATION

- A. Excavation and Bedding
- a. The precast concrete structure shall be set on a granular or compacted sand subbase in accordance with local requirements for standard manhole installation. In no instances shall the compacted sub-base material have a thickness of less than 12 inches.
 - b. The Precast concrete structure shall be set plumb to within 0.5%.
 - c. Non-shrink grout or hydraulic cement conforming to ASTM C 595 shall be used to provide a water tight seal in the lift holes, any drain holes and around the concrete knock-outs for the inlet and outlet pipes.
 - d. The contractor shall be responsible for preparing the site for the system installation including, but not limited to, temporary shoring, excavation, cutting and removing pipe, new pipe, bedding, and compaction. The contractor shall be responsible for furnishing the means to lift the system components off the delivery trucks. The contractor shall be responsible for providing any concrete antifoatation/anti-creep restraints, anchors, collars, etc. with any straps or connection devices required. The contractor shall be responsible for sealing the pipe connections to the Stormwater Treatment System, backfilling and furnishing all labor, tools, and materials needed.

END OF SECTION

SECTION 33 4104

CORRUGATED POLYETHYLENE STORM DRAIN PIPE

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill and Compaction: Section 31 2301.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's specifications (AASHTO M-252 or AASHTO M-294), including dimensions, allowable height of cover information, and installation instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Advanced Drainage Systems, Inc., 3300 Riverside Dr., Columbus, OH 43221; (614) 457-3051.
- B. Hancor, Inc., 401 Olive St., Findlay, OH 45840; (800) 847-5880.

2.2 MATERIALS

- A. Corrugated Polyethylene Pipe (Smooth Interior): Conform to AASHTO M-294 (12 to 42-inch diameter).
1. Coefficient of Roughness (interior pipe surface): 0.012 maximum (Manning formula).
 2. Classification: Type S.
 3. Minimum Pipe Stiffness Values:

DIAMETER	PIPE STIFFNESS (PER ASTM D 2412)
4", 6", 8", 10", 12"	50 psi
15"	42 psi
18"	40 psi
24"	34 psi
30"	28 psi
36"	22 psi
42"	20 psi

4. Joint Couplings: Polyethylene Couplers; snap-on type or split collar through 24-inch diameter, screw-on type where applicable.
 - a. Corrugated to match pipe corrugations, width not less than one half pipe diameter.
 - b. Split couplings shall engage an equal number of corrugations on each side of the joint.
5. Joint Couplings: Polyethylene, bell-and-spigot type couplers utilizing an elastomeric gasket conforming to ASTM F 477.

- B. Fittings:
 - 1. High density polyethylene meeting the properties specified for the pipe.
 - 2. Either molded or fabricated.
 - 3. Designed specifically for the pipe furnished and manufactured by the pipe manufacturer.
- C. End Sections:
 - 1. High Density polyethylene meeting the properties specified for the pipe.
 - 2. Designed and manufactured by the pipe manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Laying: Lay pipe to indicated line and grade with a firm uniform bearing for the entire length of the pipe. Fill excess excavation with suitable materials and tamp.
- B. Joints: Install coupling and fasten per manufacturer's instructions.
- C. Connections:
 - 1. Make connections to existing pipe by using a galvanized steel "dimple"-type coupling. Remake damaged existing joints.
 - 2. Make connections to existing manholes and drainage structures by cutting into the floor or bench of the manhole or drainage structure and forming a new channel.
 - 3. If the pipe, manholes or other structures with which connections are to be made have not yet been installed, install the pipe to a point directed by the Owner's Representative and plug or cap the end in a satisfactory manner.

END OF SECTION

SECTION 33 4914

PLASTIC DRAINAGE CHAMBERS

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill, and Compaction: Section 31 0000.
- B. Corrugated Polyethylene Storm Drain Pipe: Section 33 4104.

1.2 DEFINITIONS

- A. Plastic Drainage Chambers: High density polyethylene chambers, manufactured and designed to detain, or retain for recharge, storm water for the purpose of controlled run-off and/or infiltration back into the soil.

1.3 SUBMITTALS

- A. Product Data: Catalog sheets, specifications, and installation instructions.
 - 1. Include pertinent information regarding dimensions and fittings.
- B. Shop Drawings: Drawings showing connections to all adjacent work.

1.4 QUALITY ASSURANCE

- A. Testing Requirements: In ground structural tests shall have been performed by a registered Professional Engineer and meet an AASHTO rating of H-20 (32,000 lbs/axle) with 18 inches of cover.

1.4 REQUIRED INSPECTIONS

- A. Design engineer shall be contacted to inspect system installation prior to backfilling with gravel.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Model and Manufacturer: Recharger 360HD as manufactured by Cultec INC, 878 Federal Road, Brookfield CT 06804.

2.2 MATERIALS

- A. Plastic leaching chambers shall be manufactured from high density polyethylene.
- B. The density of polyethylene raw material shall be a minimum of .959 g/cm³ - ASTM D1248, D1505.

2.3 TYPE AND FITTINGS

- A. Provide high capacity units of plastic arch shape, open-bottomed chamber with side wall openings. Nominal unit dimensions shall be 36 inches high x 60 inches wide x 50 inches long.

- B. Each unit shall have a minimum storage capacity of 36.66 cubic feet per unit.
- C. Each unit shall contain 56 discharge holes in the side wall to promote the lateral flow of water.
- D. Each chamber shall have an access port at the top of the arch in the center of the unit to allow access to the unit.
- E. End units shall be a continuously formed unit. End plates may not be used.
- F. Inlet pipes shall be cut into the endcaps at the location specified by the manufacturer for the pipe size used.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Prepare ground and install the Work of this Section in accordance with the manufacturer's printed instructions.

END OF SECTION